

 Weatherford®	HyPulse Fishing Jar Slinger Service Manual		Prepared By:	Approval
			J. Beverly	Chris Mann
Document Number	Document Classification	Document Level	Revision No.	Issue Date
GL-DRT-OEPS-L4-24	Controlled	L4	08	January 8, 2019



HYPULSE FISHING JAR SLINGER SERVICE MANUAL

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WEATHERFORD SERVICE MANUAL

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Service Manual Contains the following part numbers:

p/n: 1529000	1-13/16 x 1/2 HFA	p/n: 1524000	4-3/4 x 2-1/4 HFA
p/n: 1530000	2-1/4 x 11/16 HFA	p/n: 1526000	6-1/4 x 2-1/4 HFA
p/n: 1525000	3-1/8 x 1-1/4 HFA	p/n: 1521000	6-1/2 x 2-3/4 HFA
p/n: 1623000	3-1/8 x 1-1/2 HFA	p/n: 1527000	7-3/4 x 3 HFA
p/n: 1528000	3-3/4 x 1-15/16 HFA	p/n: 1522000	8 x 3 HFA
p/n: 1523000	4-1/4 x 2-1/8 HFA		

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CHAPTER: 20.000- SAFETY

20.010 – Risk Involved when Servicing the HFS

The HFA has undergone a safety check and certification before shipment. Incorrect operation or misuse threatens:

- The life and limb of the operator and the surrounding personnel
- This device and other material assets of the operating authority
- The efficient performance of this device.

The servicing authority of this unit must ensure, that all persons having to do with, operation, cleaning, maintenance, testing, handling, repairing and servicing of the unit must:

- • Be qualified according to the requirements and authorized by the servicing authority.
- • Follow this service manual thoroughly. It is recommended to the servicing authority, that all persons having read the servicing manual confirm the knowledge with their signature.

Safety first. Don't risk anything!

Remember: If you are not part of the solution, you are part of the problem!

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20.020 – Safety Instructions and Hints

The following symbols are used in this manual:

 WARNING	WARNING
	Describes a possibly dangerous situation.
	Disregard can lead to death or severe injury.
 CAUTION	CAUTION
	Describes a possibly dangerous situation.
	Disregard can lead to minor injury.
 NOTE	NOTE
	Describes a possibly harmful situation. Disregard can damage this device or other material assets in its working range.
	This sign also marks useful operating hints.

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20.030 – Designated Use

The WEATHERFORD HyPulse Fishing Slinger is run in conjunction with the HFJ and is designed to reach total stroke at maximum over pull to provide a nearly constant amplification factor across a large range of over pulls with the maximum impact taking place at maximum over pull. Rugged, durable construction provides reliability and longer tools life.

 NOTE	NOTE
	Do not exceed torque values listed within the servicing manual.
	Over-torque to the jar components can result in injury to operators and/or damage to equipment.

Using the HFS for purposes other than expressly mentioned above is considered contrary to its designated use and is therefore prohibited. The manufacturer cannot be held liable for any damage resulting from such use. The risk of such misuse lies entirely with the user. Never make any modifications, additions, or conversions without the manufacturer's approval. Operating the jar within the limits of its designated use also involves observing the instructions set out in the operating manual and comply with the inspection and maintenance directives.

20.040 – Sources of Danger

- During the repair and maintenance of the HFS, possible sources of danger could be high pressure, heavy objects, and pinching points and slip hazards.
- Disregarding the safety instructions can lead to severe injury.
- The servicing authority must ensure to service the jar only in unobjectionable state. Consider the above and follow these directives:
- Always use required personal protective equipment (PPE).
- During disassembly, oil will flow out of the remaining jar. Precautions should be made to capture this oil so a slip hazard can be prevented.
- Do not place any part of your body in the path of the fluid plug while removing it. Be careful when removing each fluid plug to allow all trapped internal pressure to bleed off while the fluid plug threads are still engaged.
- When cutting back-up wipers, cut away from body.
- Use proper lifting procedure for components less than 40 pounds. Use overhead cranes to lift anything greater than 40 pounds.
- Do not attach the air line to the jar before it is placed in the test rack.
- Be very careful when installing/extracting the Truarc Snap Ring.

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20.050 – Danger Zones

- The service area or in its proximity where the risk of injury or health damage exists has to be declared as danger zone.
- Danger zones must clearly be declared and protected by barriers and/or labeled with warning signs to prevent unauthorized entering.
- Missing or unreadable warning labels at the unit or its surrounding area must be replaced immediately.
- During service, no other person than the service technicians must enter the danger zone.
- Only objects which are absolutely required for the service of the jar are allowed to be placed inside a danger zone.

20.060 – Qualification of Personnel

- Only personnel familiar with the handling of jar equipment and trained and properly instructed concerning service may service the jar. The individual responsibilities of the personnel who operate, set-up, maintain and repair this jar must be stated clearly. Remember, during servicing the technician is responsible for third parties. Only personnel sufficiently competent, trained and certified in handling jar equipment may repair tools.
- Unclear responsibilities are a safety hazard.
- The servicing authority must ensure that:
- The service manual is available to all involved personnel
- All involved personnel have read and understand the contents of these manuals, in particular the chapters on safety, before beginning work.

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20.070 – Protective Clothing

The protective clothing required for using the jar is the same as that typically used on drilling rigs. these requirements are determined by other equipment used in conjunction with the servicing of the jars as they require a higher level of protection.



Hard hat to protect the head against falling parts and overhead equipment.



Eye protection glasses must be worn to protect against flying particles.



Safety boots to protect against erroneous rest of the equipment.



Safety gloves to protect the hands against aggressive grease, lubricants and mud.



Hearing protect to prevent hearing loss from loud noises.

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CHAPTER: 30.000-INTRODUCTION

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All instructions and depictions contained in this manual are to be considered true and accurate as of the date of release. Revisions will be forwarded to all employees who have been assigned a product technical manual. these revisions should be inserted into each manual upon receipt and the replaced pages removed and returned to the engineering department at the Northwoods manufacturing office of Weatherford international inc. all employees should be made aware of revisions as they are received so as to avoid errors in assembly, testing, and preparation and/or care of products.

Any improvements to established procedures within this manual are welcomed and will be reviews upon receipt. Submit any suggestions to the engineering dept. at the following location.

 NOTE	NOTE / PROCEDURE
	All repair procedures contained within this service manual can be conducted in either a tong and vise as depicted, or in a break out unit.

Weatherford International Inc.

Attn: Engineering Dept.

12227 FM 529 Northwoods West

Houston, Texas 77041

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CHAPTER: 40.000-DISASSEMBLY

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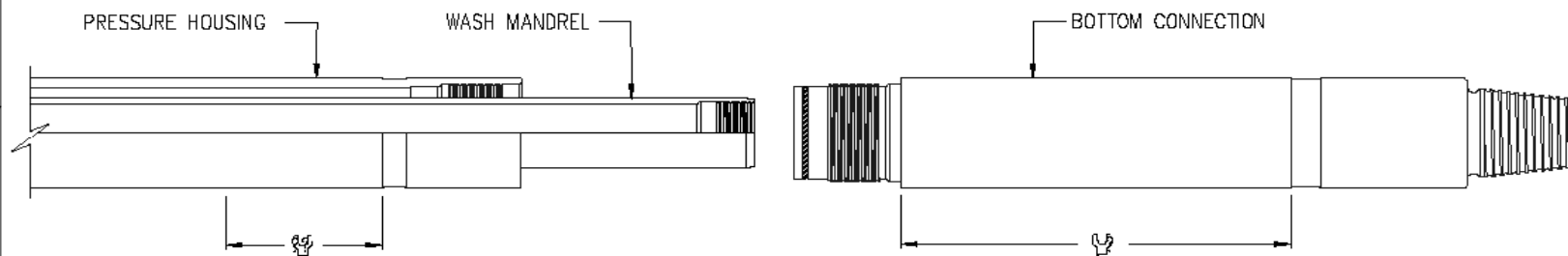
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BOTTOM SECTION

TEST TOOL USING INSTRUCTIONS PROVIDED IN SECTION #B0.010

ALL THREADS ARE RIGHT HANDED UNLESS OTHERWISE DESIGNATED. (REFER TO TORQUE CHART FOR PROPER TORQUE VALUES). DUE TO EXCESSIVE DRILLING TORQUE SOME EXTERNAL CONNECTIONS MAY REQUIRE ADDITIONAL TORQUE TO BREAK.



BREAK AND REMOVE THE BOTTOM CONNECTION.



REMOVE BALANCE PISTON SPRING
WARNING: DURING DISASSEMBLY OF THE BOTTOM CONNECTOR, BE CAREFUL WHEN REMOVING. THERE MAY BE SPRING FORCE APPLIED TO THE BOTTOM CONNECTOR FROM BALANCE PISTON SPRING.

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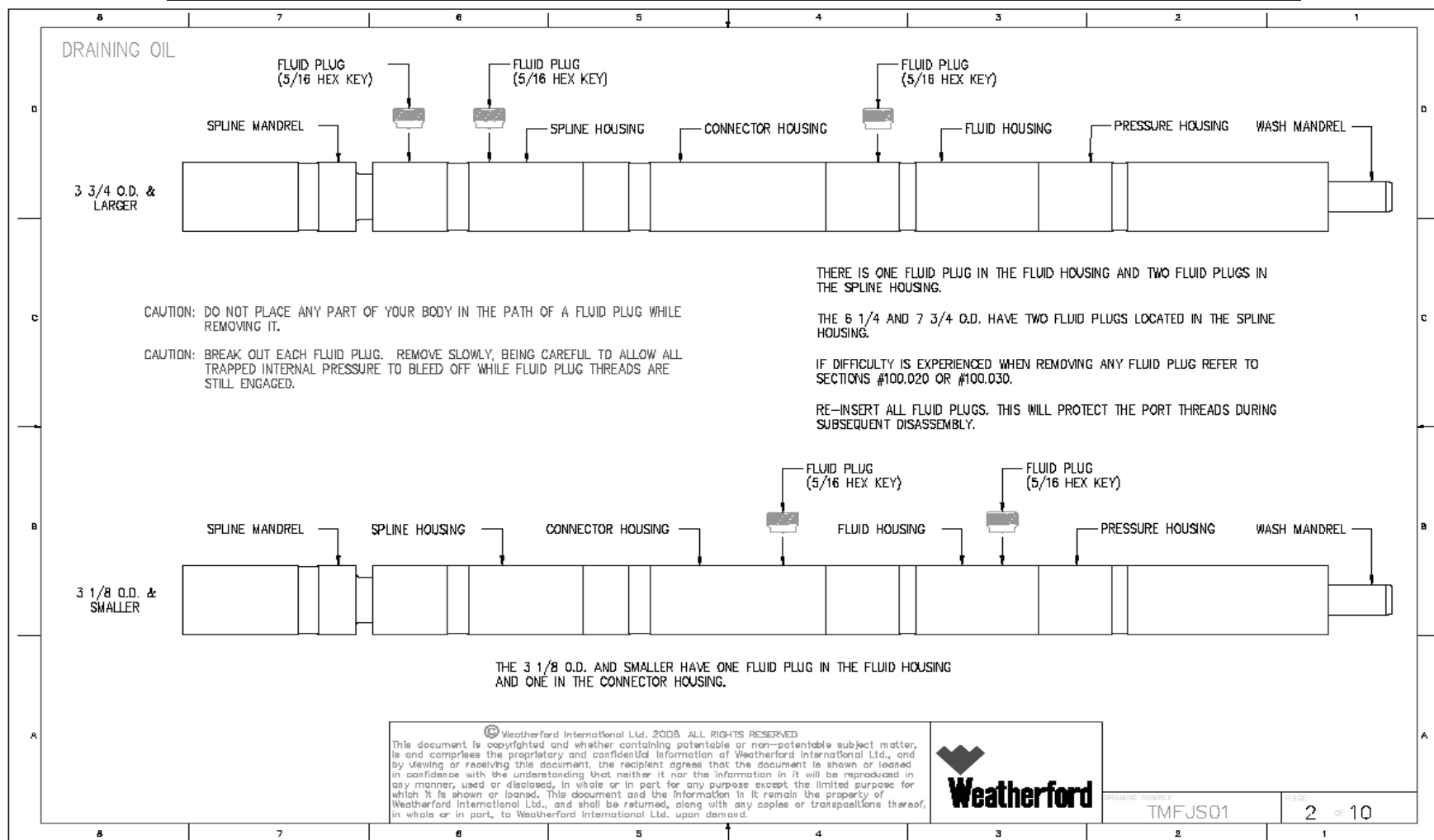
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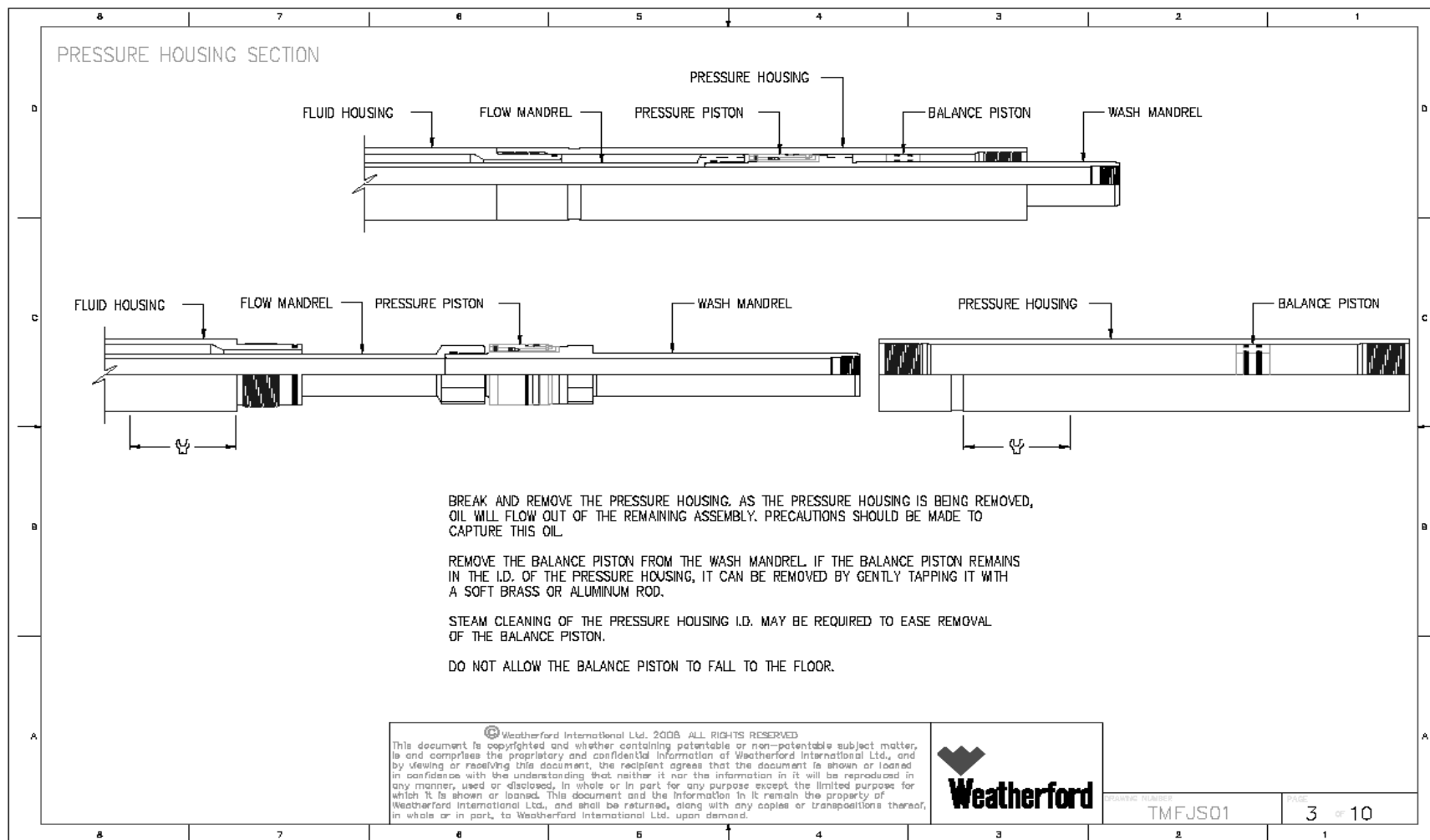
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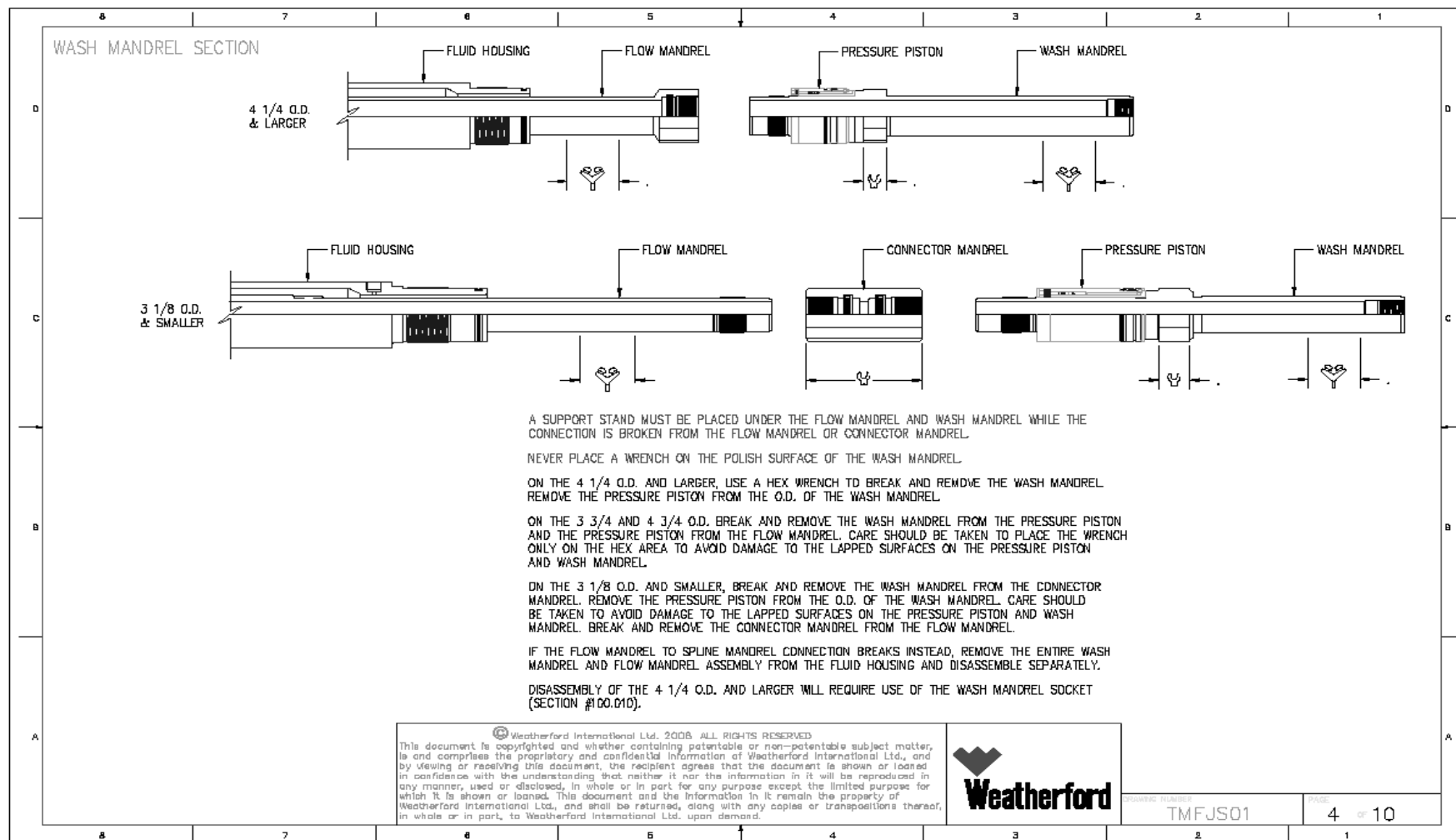
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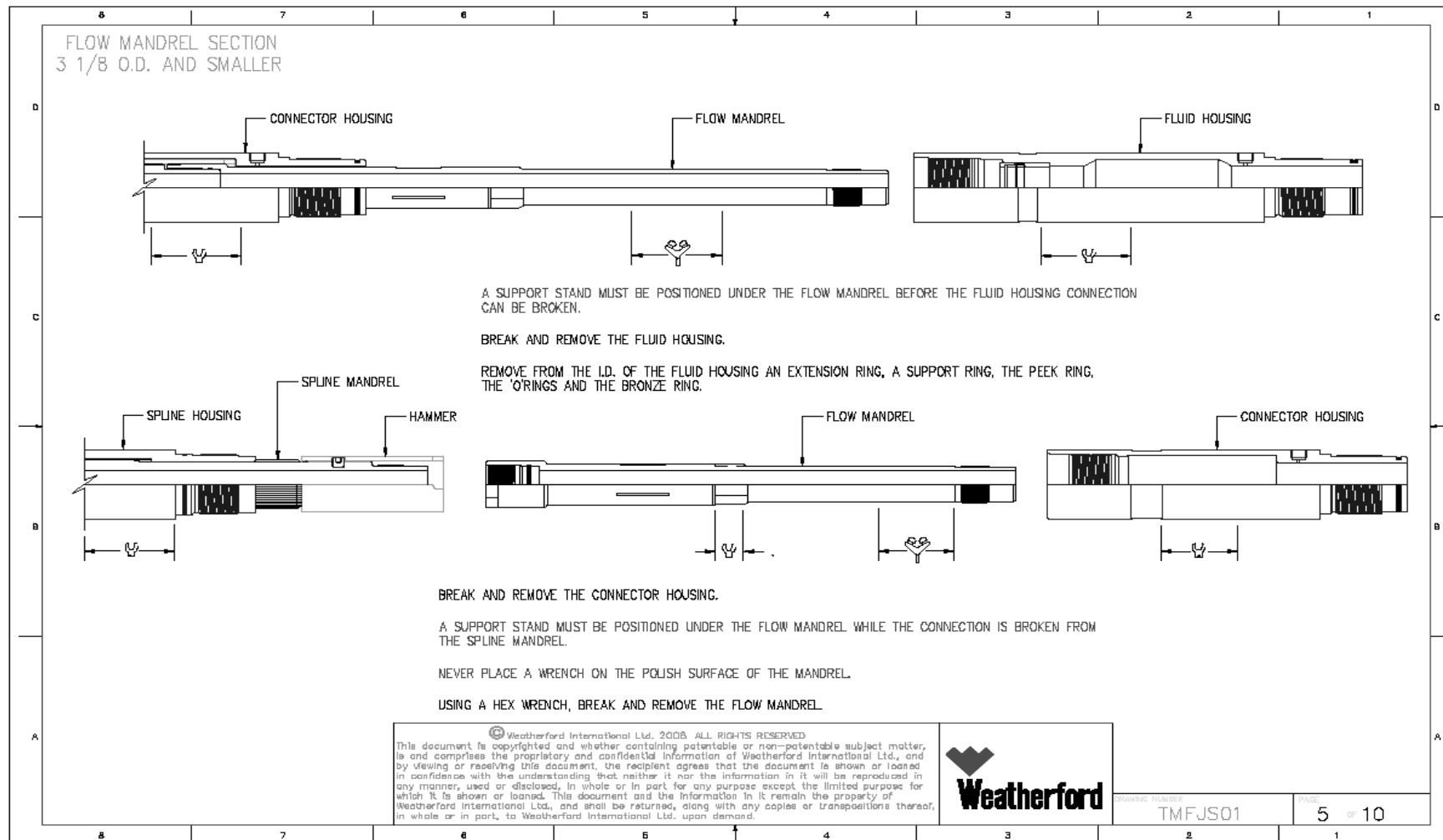
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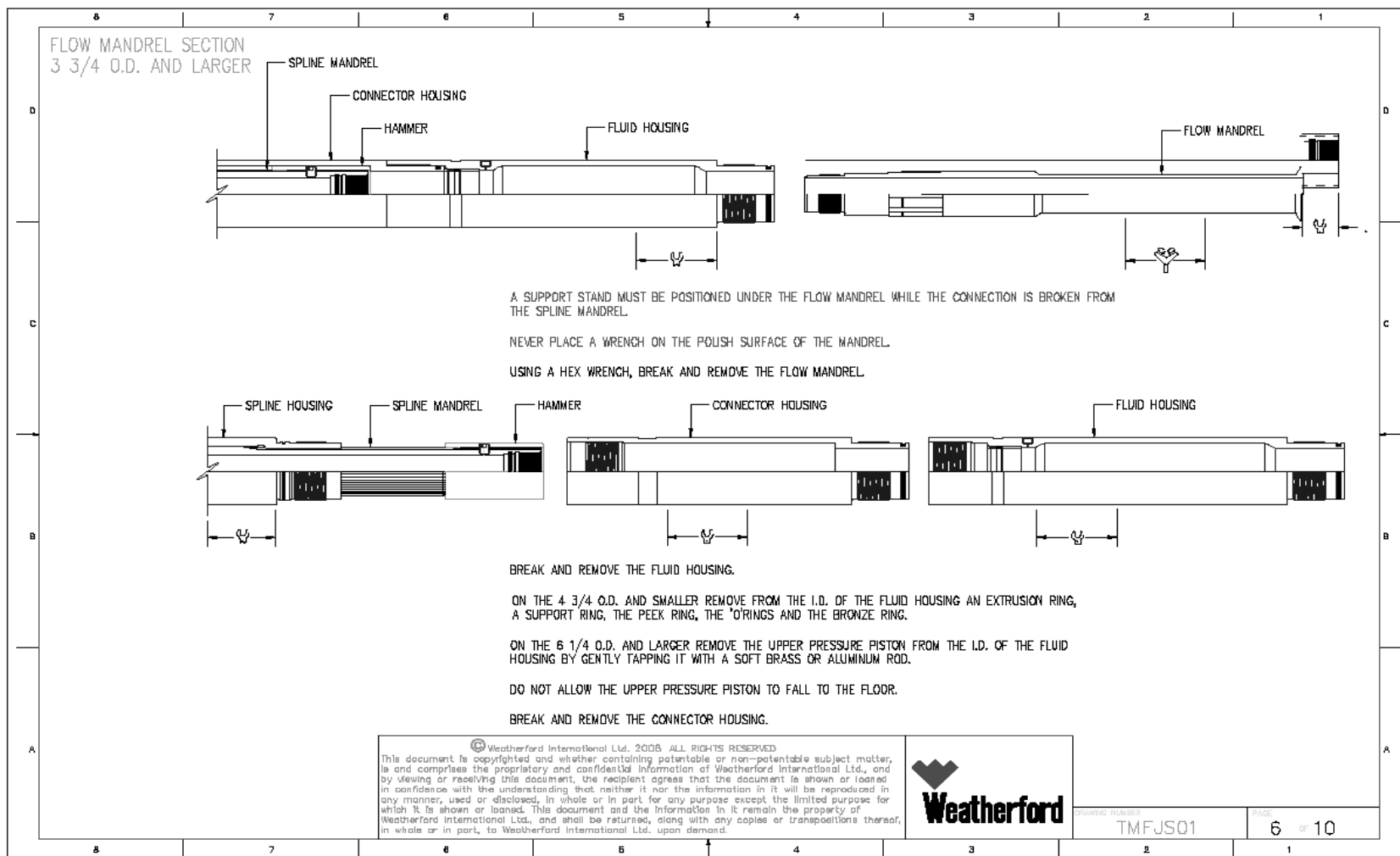
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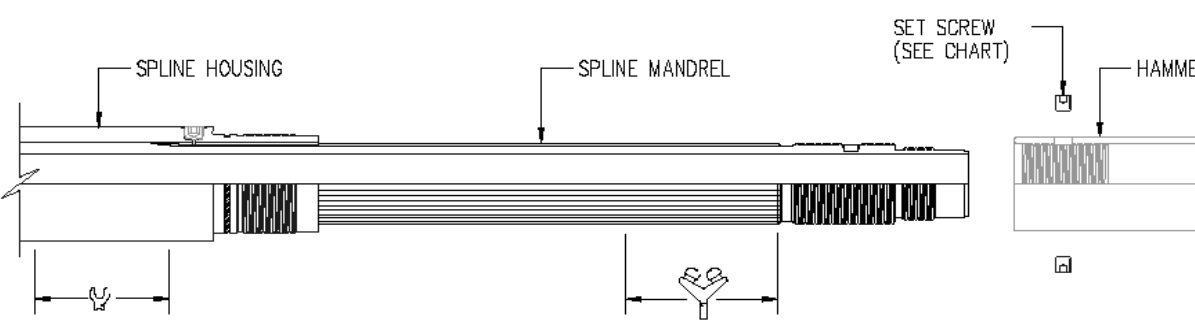
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HAMMER SECTION



SET SCREW (SEE CHART)

HAMMER

TOOL SIZE	KEY SIZE
1 13/16 x 1/2	5/32
2 1/4 x 11/16	3/16
3 1/8 x 1 1/4	1/4
3 3/4 x 1 15/16	1/4
4 1/4 x 2 1/8	1/4
4 3/4 x 2 1/4	5/16
6 1/4 x 2 1/4	3/8
7 3/4 x 3	3/8

BREAK AND REMOVE THE TWO SET SCREWS FROM THE HAMMER.

ON THE 4 1/4 O.D. AND SMALLER SIZES, UNSCREW THE HAMMER UNTIL ONLY TWO THREADS ARE ENGAGED. USING A RUBBER Mallet, CAREFULLY TAP ON THE HAMMER PUSHING THE SPLINE MANDREL THROUGH THE SPLINE HOUSING UNTIL IT CAN BE REMOVED BY HAND.

ON THE 4 3/4 O.D. AND LARGER SIZES, REMOVE THE HAMMER AND PULL ON THE SPLINE MANDREL USING THE PUSH-PULL TOOL UNTIL THE SPLINE HOUSING PIN IS OVER THE SPLINE MANDREL PIN. SLIDE THE SPLINE MANDREL OUT OF THE SPLINE HOUSING.

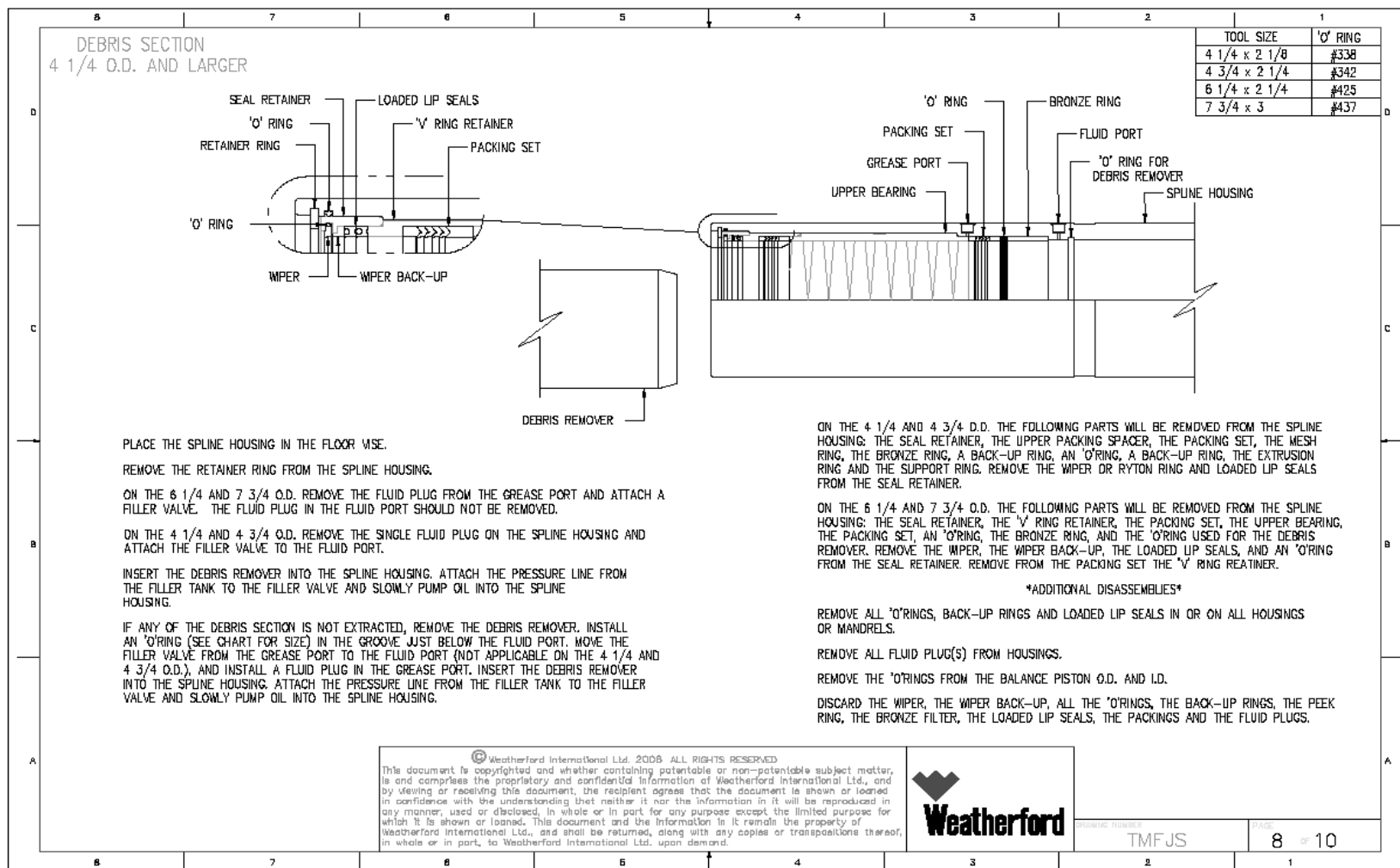
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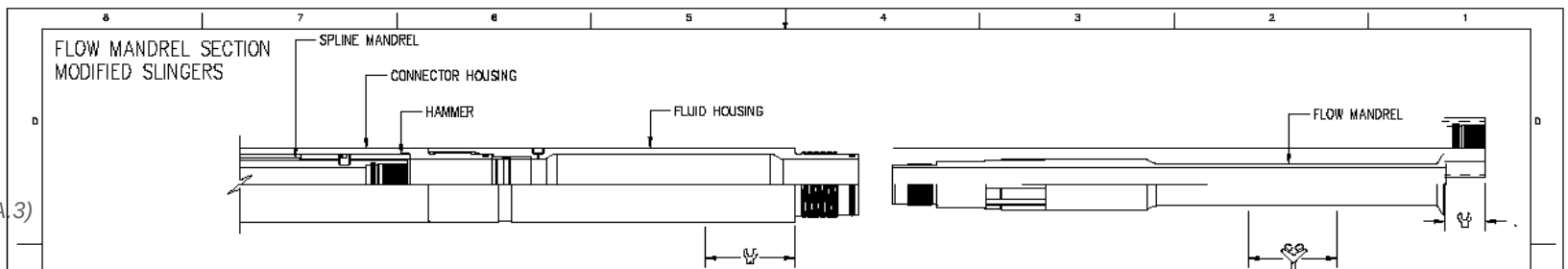
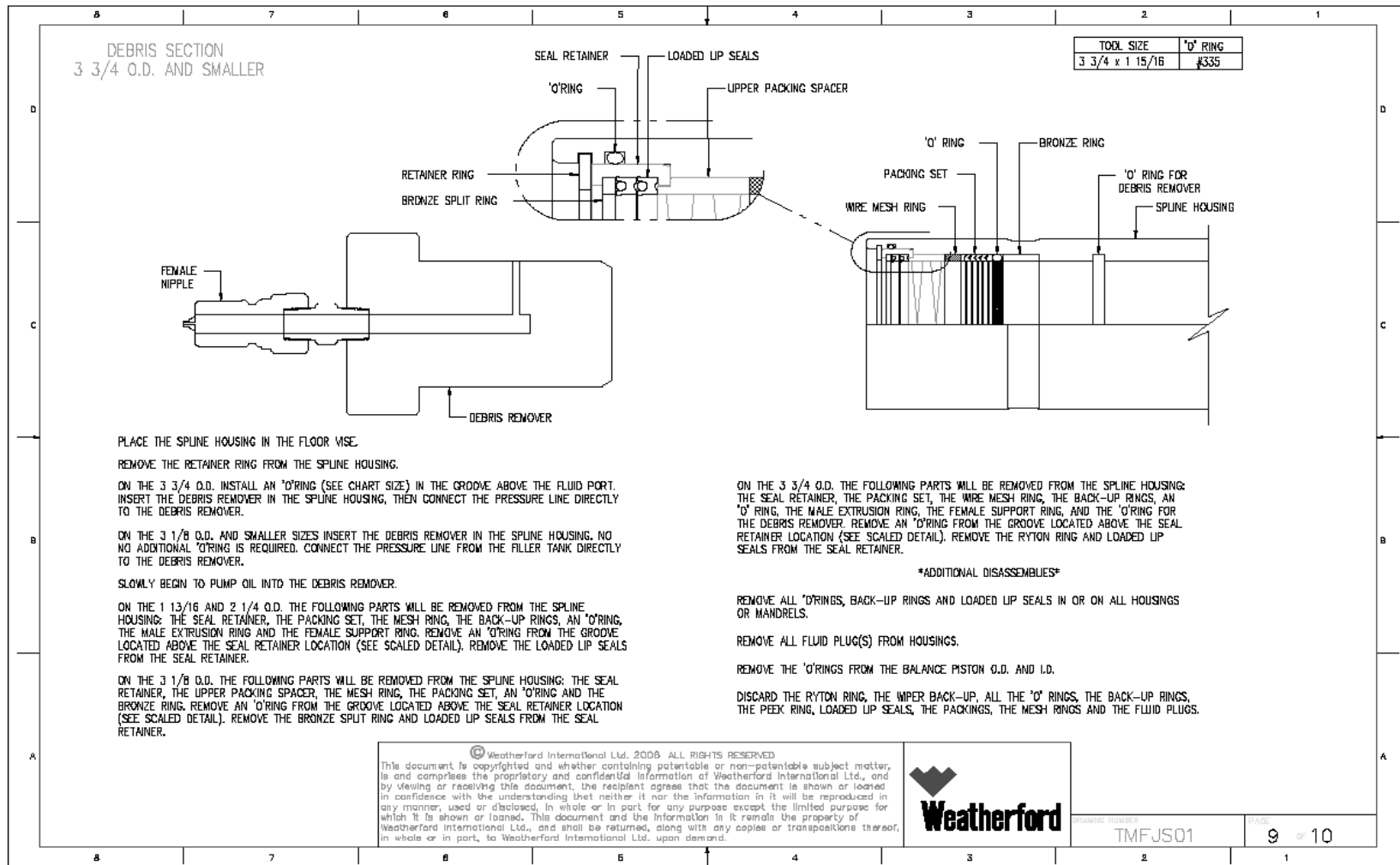
 Weatherford®	HyPulse Fishing Jar Slinger Service Manual		Prepared By:	Approval
			J. Beverly	Chris Mann
Document Number	Document Classification	Document Level	Revision No.	Issue Date
GL-DRT-OEPS-L4-24	Controlled	L4	08	January 8, 2019



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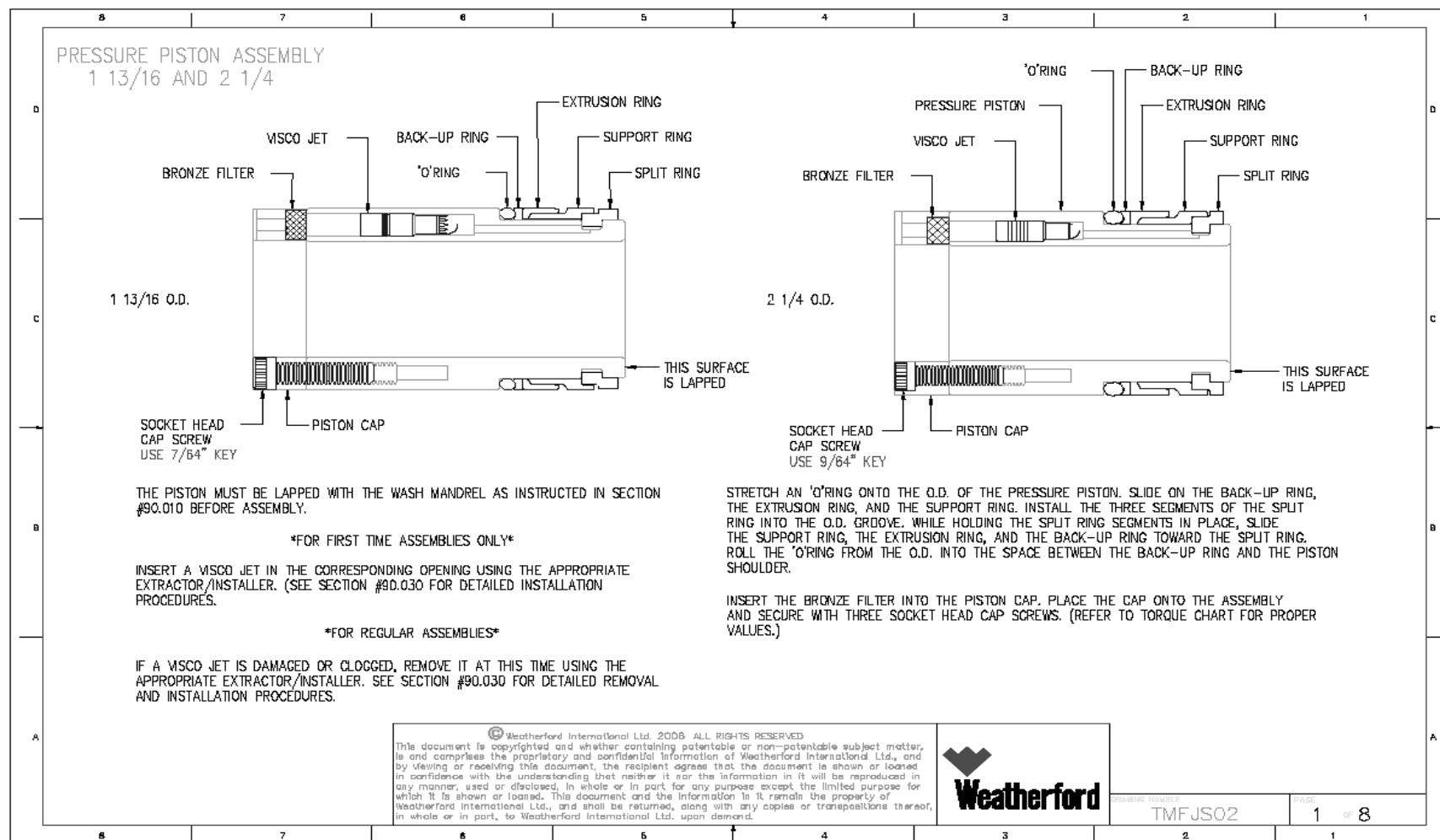
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CHAPTER: 50.000- PREASSEMBLY

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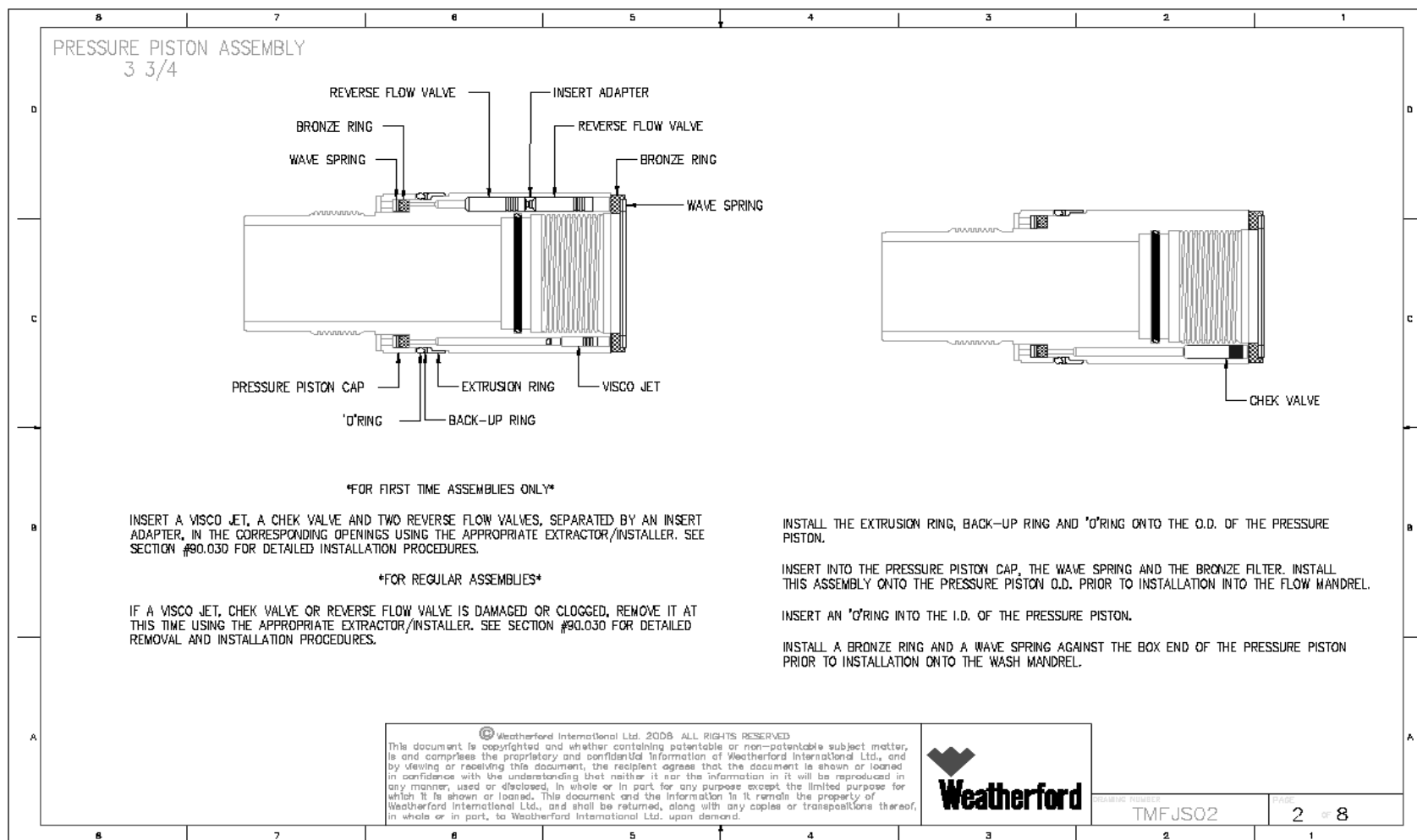
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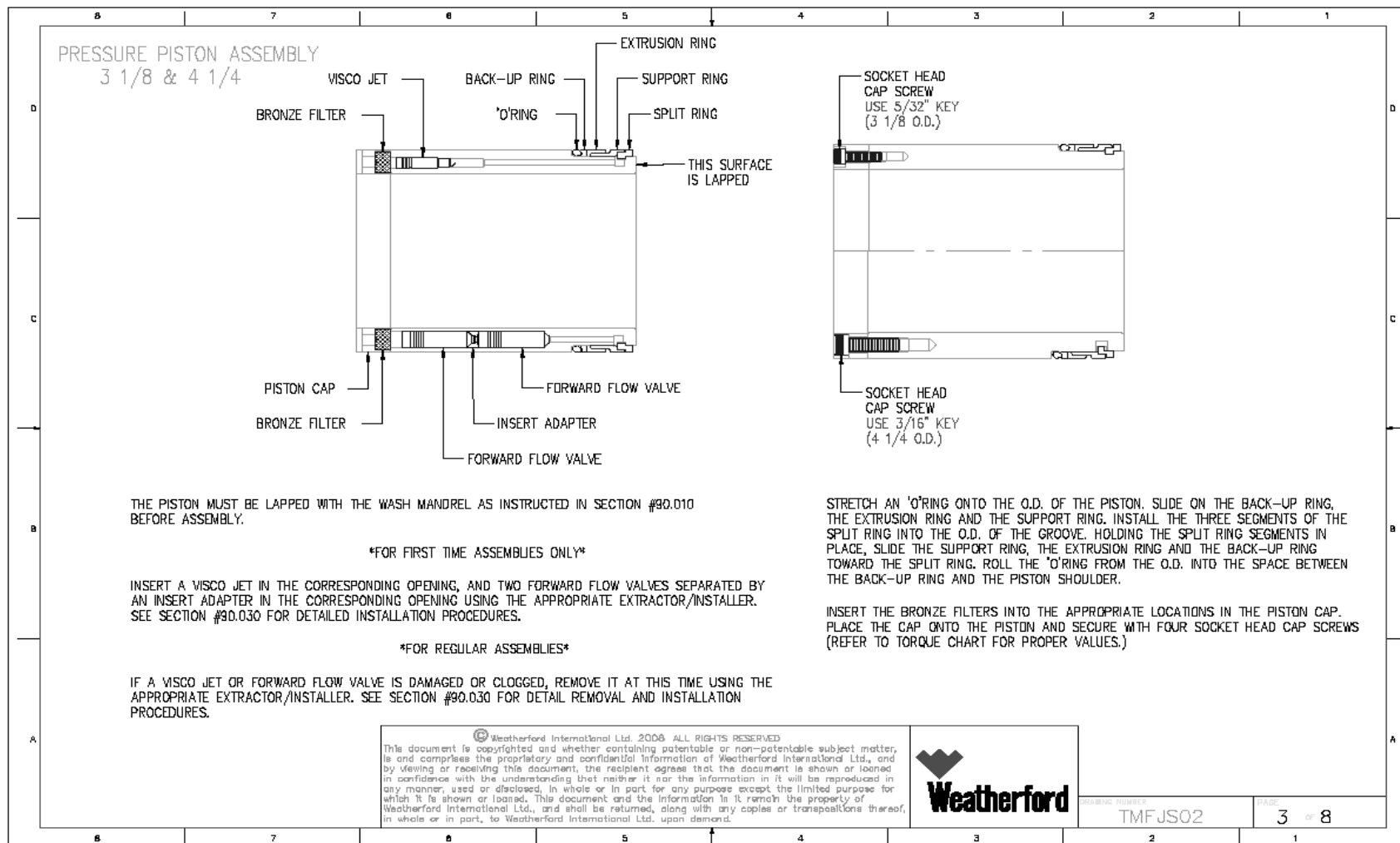
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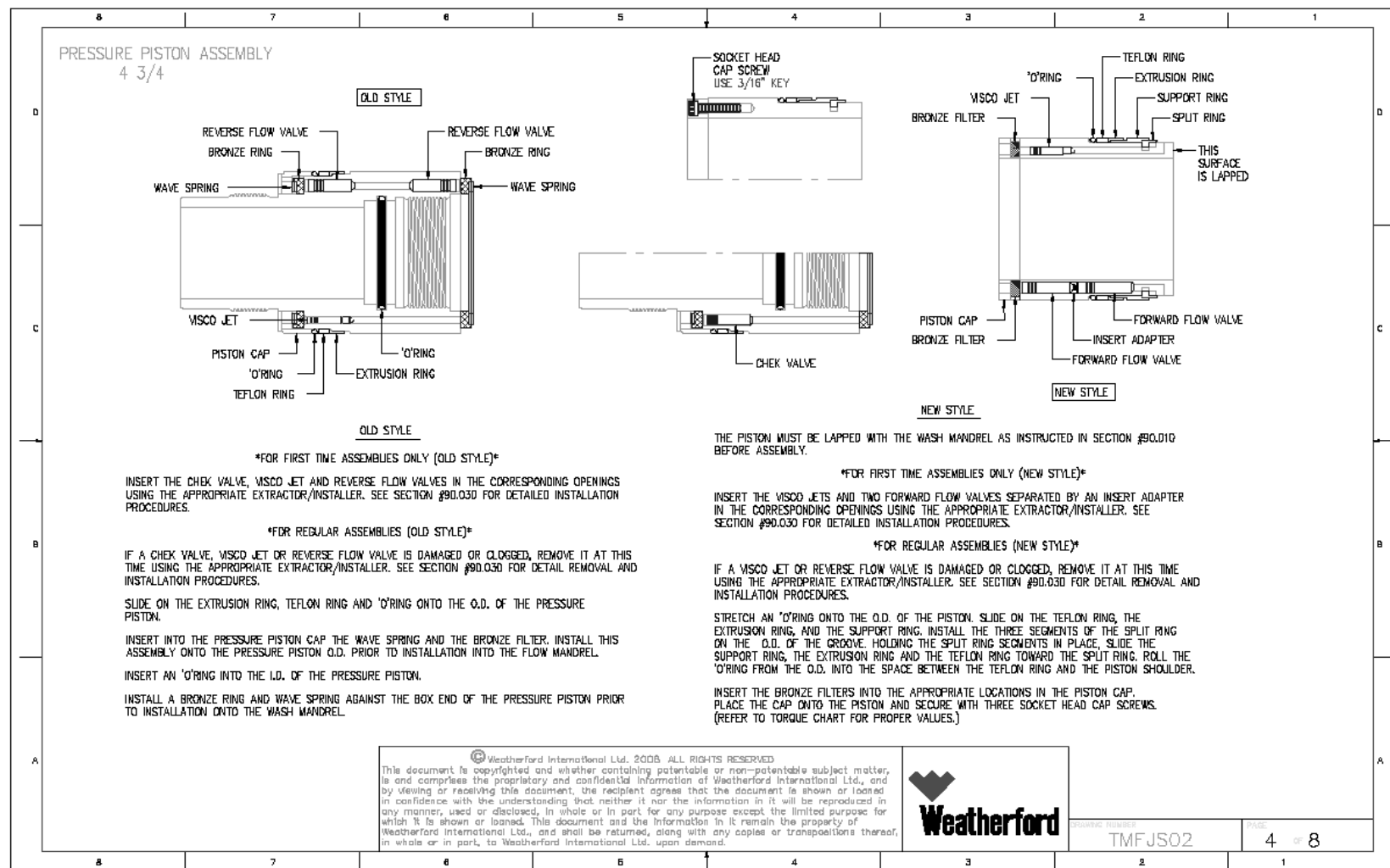
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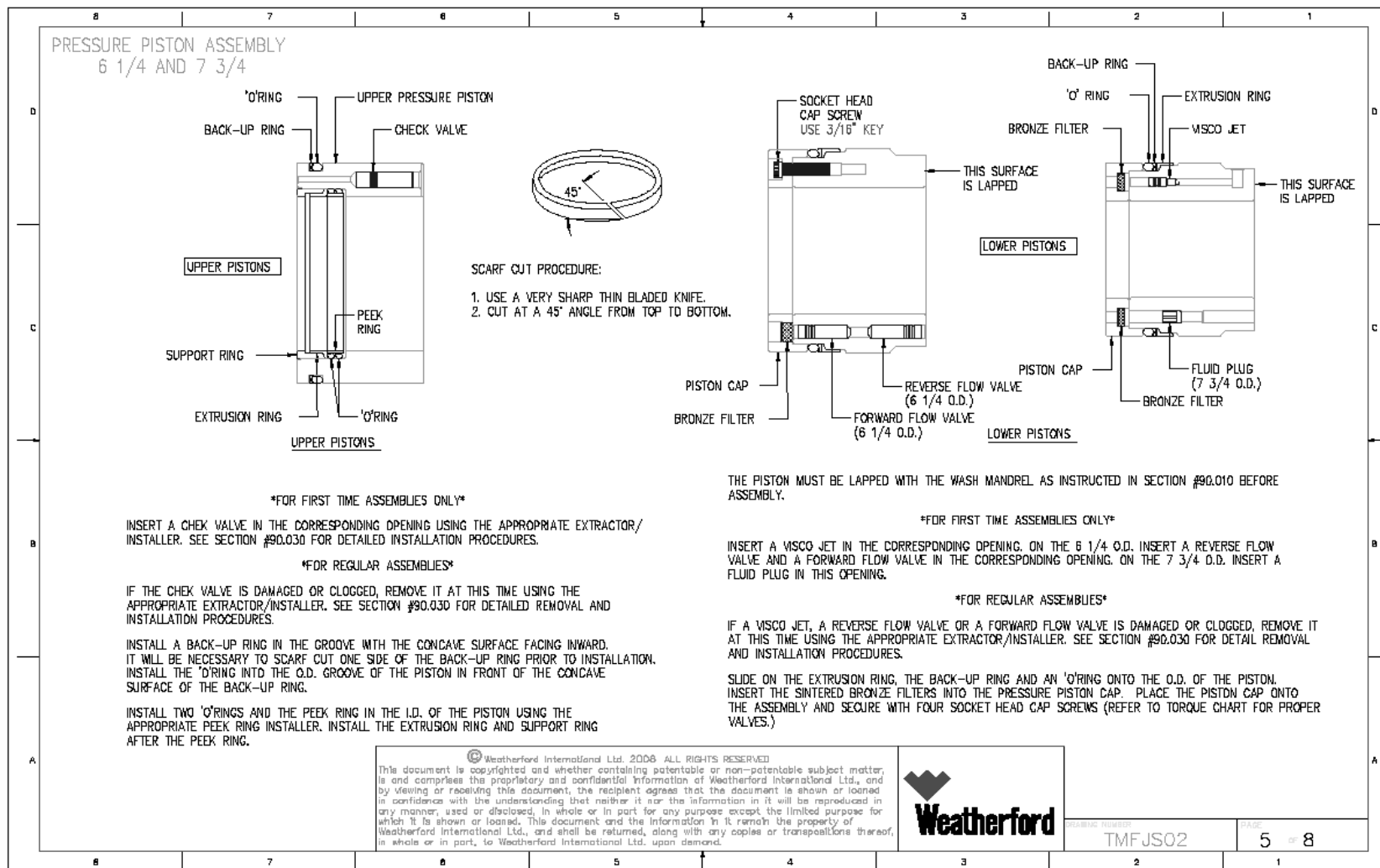
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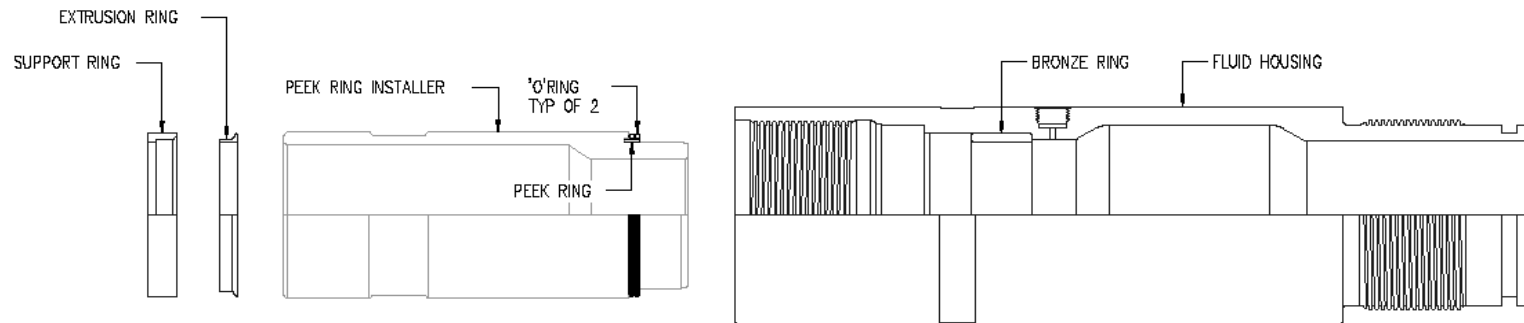


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PEEK RING ASSEMBLY 4 3/4 O.D. AND SMALLER



ALL PARTS SHOULD BE THOROUGHLY LUBRICATED WITH SILICON GREASE PRIOR TO ASSEMBLY.

INSERT THE BRONZE RING INTO THE FLUID HOUSING.

USING THE PEEK RING INSTALLER, INSTALL THE PEEK RING AND TWO 'O'RINGS ASSURING THAT THEY SEAT PROPERLY IN THE HOUSING.

INSTALL THE EXTRUSION RING AND SUPPORT RING.

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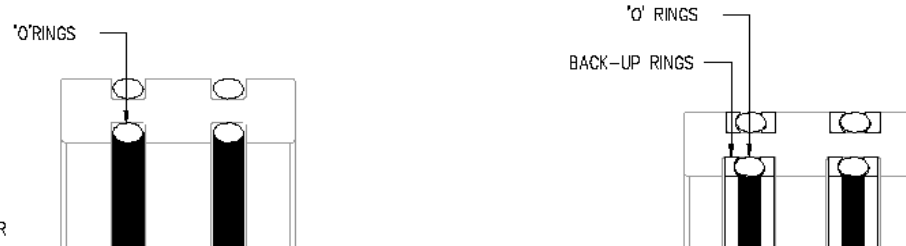


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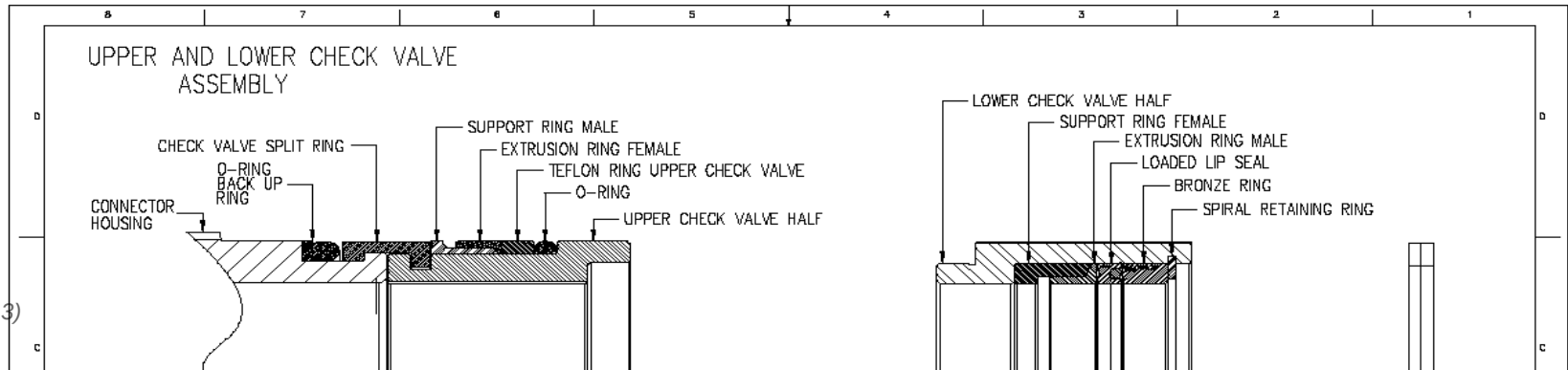
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BALANCE PISTON ASSEMBLY

4 3/4 O.D. AND SMALLER



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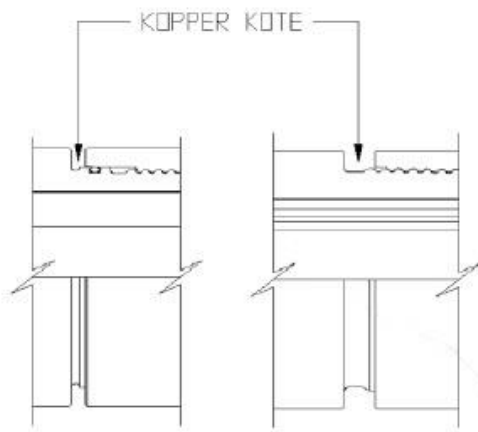
CHAPTER: 60.000- ASSEMBLY

60.010 – Assembly Procedure

 NOTE	NOTE
	- During slinger assembly, the environment must be kept as clean as possible. No cloth rags are permitted. - Use only lint free paper towels, p/n c025000. These towels are not to be used to wipe any part.

SCL-150 (or equivalent) not Silicon oil, should be used for lubrication of all threaded connections and seal areas.

Apply a thin film of copper base thread lubricant (Kopper Kote) to all outer connection shoulders just prior to complete make-up. This will prevent shoulder galling. Do not allow the Kopper Kote to contaminate the fluid wetting areas of all parts.

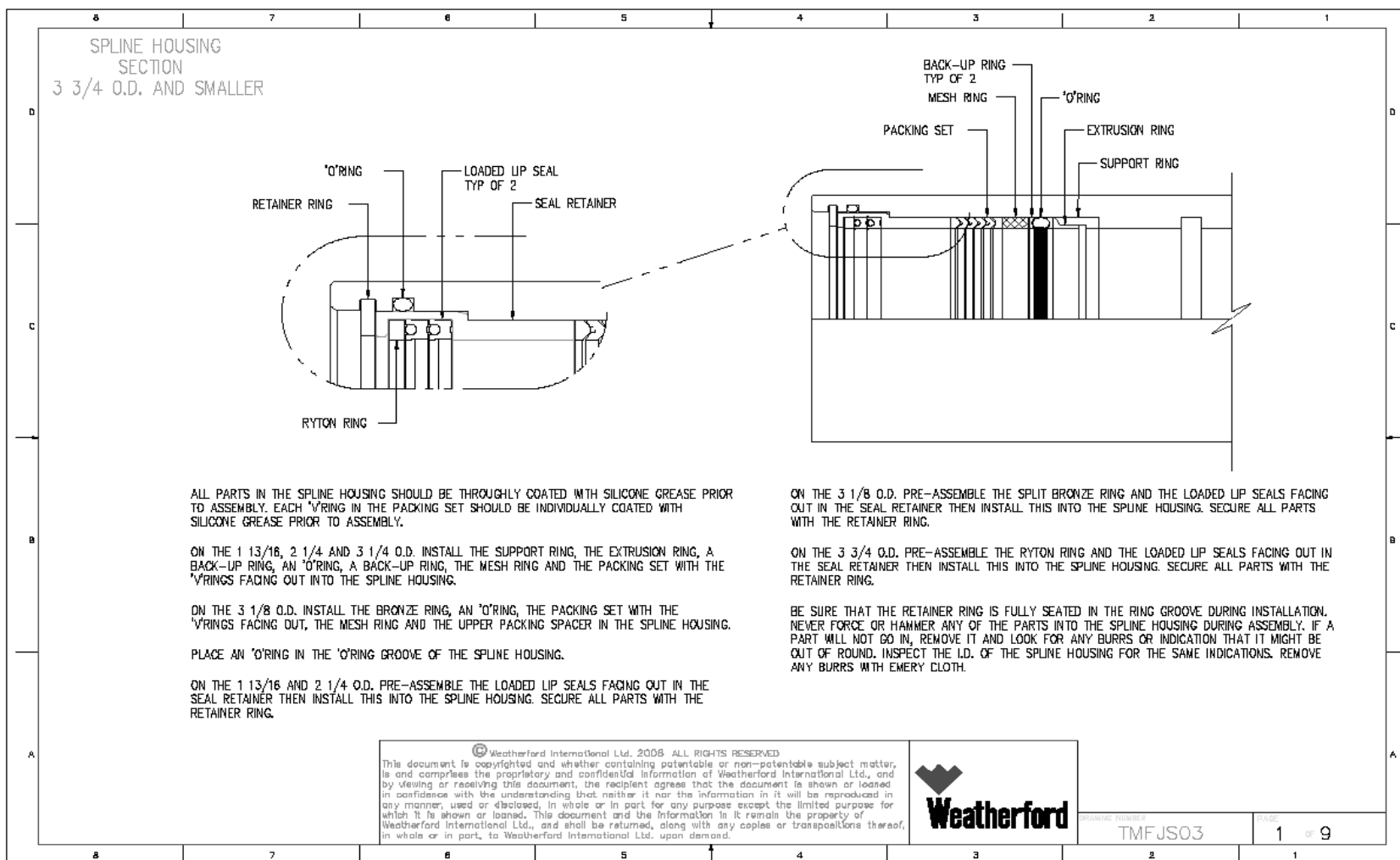


Check all threads for burrs, and polish if necessary. Check all shoulders. If rework is necessary, contact the Weatherford / Dailey Representative. It is good practice to trial fit any of the internal parts which may have questionable wear, prior to beginning the normal reassembly procedures. Most all of the internal parts should maintain very close fits

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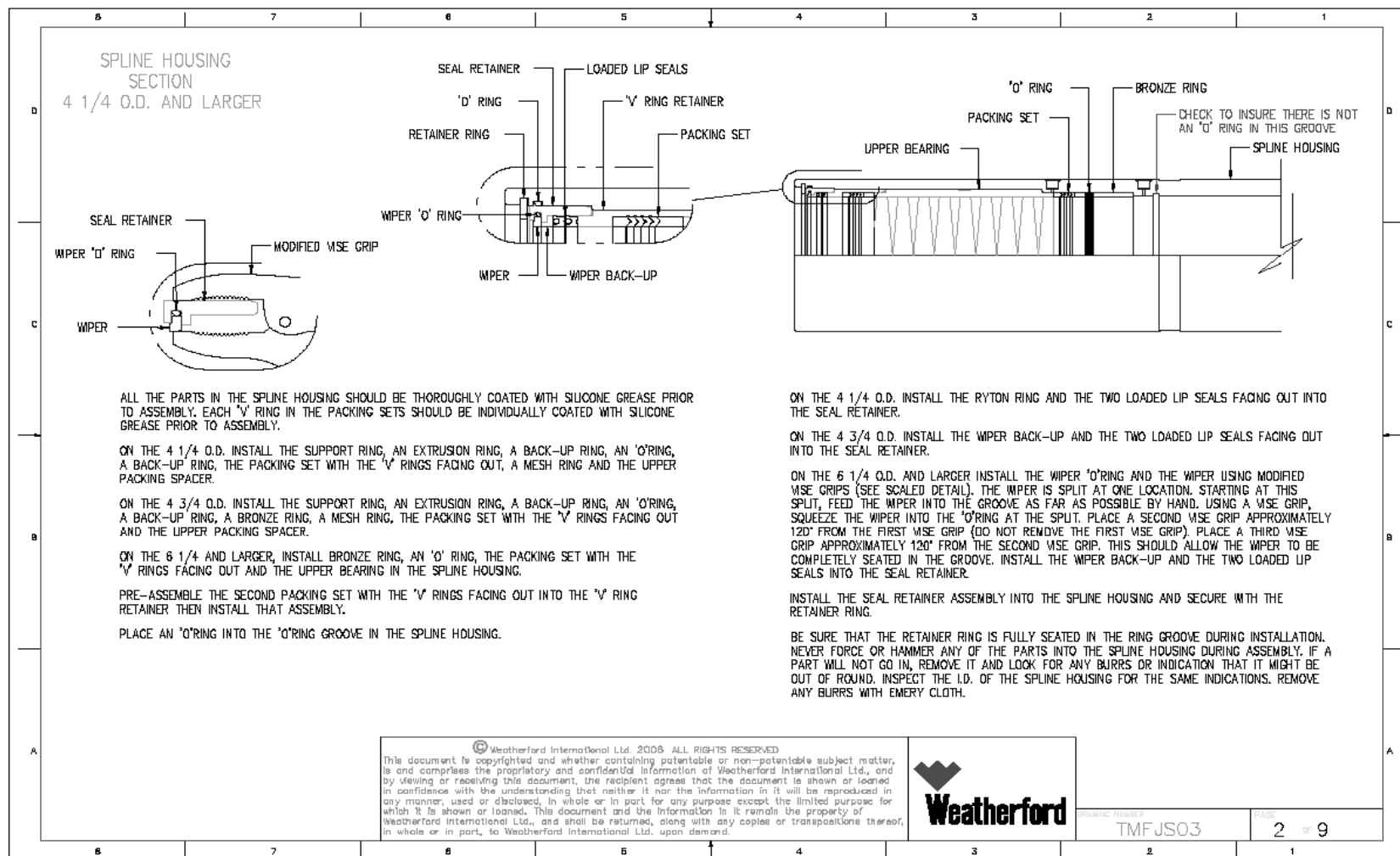
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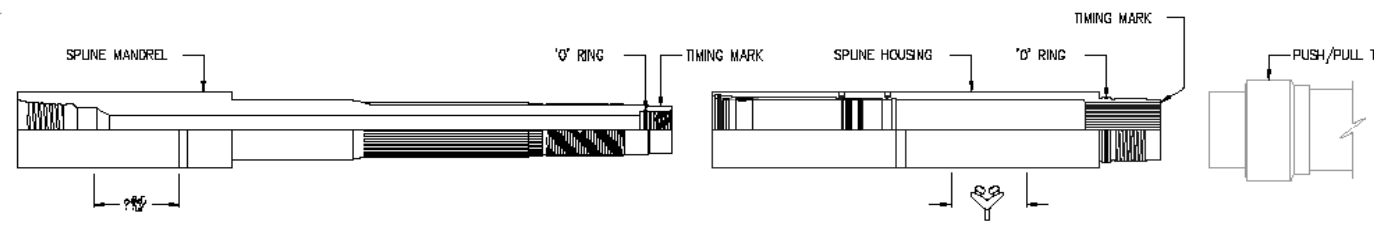
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8 7 6 5 4 3 2 1

SPLINE MANDREL SECTION



ON THE 4 1/4 O.D. AND SMALLER, PLACE AN 'O'RING IN THE 'O'RING GROOVE OF THE SPLINE HOUSING PIN.

ON THE 4 3/4 O.D. AND LARGER, PLACE AN 'O' RING IN THE 'O' RING GROOVE OF THE SPLINE HOUSING PIN AND IN THE LOWER SPLINE MANDREL BOX.

ON THE 4 3/4 O.D. AND LARGER, PLACE THE SPLINE MANDREL IN THE FLOOR VISE SO THAT THE TIMING MARK IS LOOKING UP. POSITION THE SPLINE HOUSING ON A STAND SO THAT IT IS LEVEL WITH THE SPLINE MANDREL.

ON THE 4 1/4 O.D. AND SMALLER, PLACE THE SPLINE HOUSING ON THE FLOOR VISE SO THAT THE TIMING MARK OR FLUID PORT IS LOOKING UP. POSITION THE SPLINE MANDREL ON A STAND SO THAT IT IS LEVEL WITH THE SPLINE HOUSING.

APPLY SILICON OIL TO THE SPLINE MANDREL BEFORE INSERTION INTO THE SPLINE HOUSING.

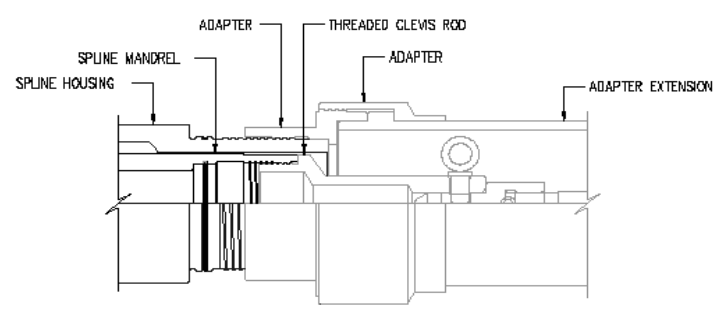
SLOWLY SLIDE THE SPLINE HOUSING ONTO THE SPLINE MANDREL BY HAND.

CARE SHOULD BE TAKEN DURING THIS PROCEDURE TO MINIMIZE THE CHANCE OF CUTTING OR DAMAGING A SEAL OR 'O' RING.

ENGAGE THE SPLINES OF BOTH PARTS BY HAND SO THAT BOTH TIMING MARKS ARE ALIGNED WITH EACH OTHER.

ON THE 4 3/4 O.D. AND LARGER THREAD THE PUSH/PULL TOOL ASSEMBLY ONTO THE SPLINE MANDREL AND SPLINE HOUSING AS ILLUSTRATED BELOW. USING THE PUSH/PULL TOOL, PUSH THE SPLINE HOUSING ONTO THE SPLINE MANDREL UNTIL THE SPLINE MANDREL SHOULDER NEARS THE SPLINE HOUSING.

ON THE 4 1/4 O.D. AND SMALLER, HAMMER THE SPLINE MANDREL INTO THE SPLINE HOUSING USING A RUBBER Mallet UNTIL THE SPLINE MANDREL SHOULDER NEARS THE SPLINE HOUSING.



8 7 6 5 4 3 2 1

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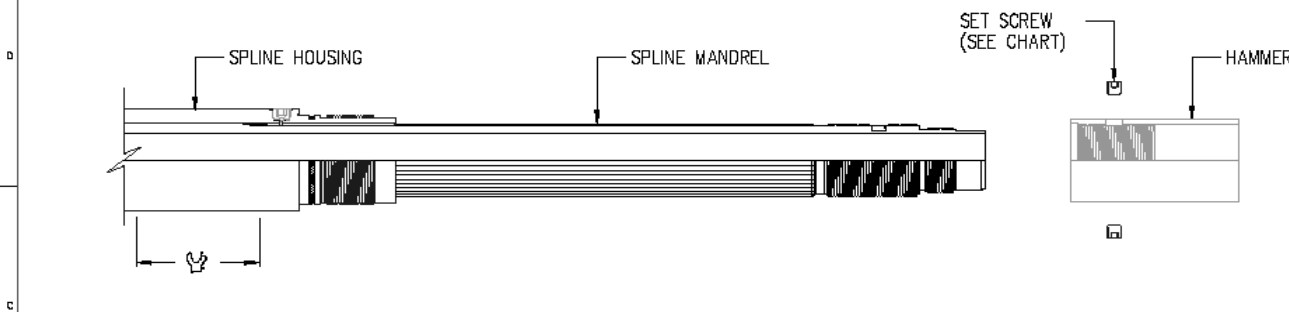
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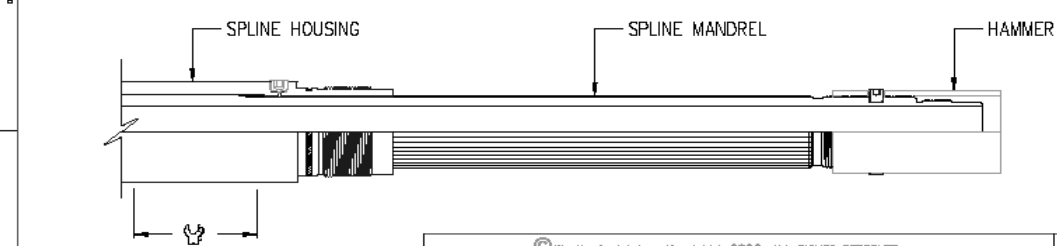
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8 7 6 5 4 3 2 1

HAMMER SECTION



LUBRICATE THE SPLINE MANDREL AND THREADS ON THE PIN END WITH SILICON OIL. THREAD THE HAMMER ONTO THE MANDREL UNTIL THE TWO SET SCREW HOLES ARE ALIGNED WITH THE THREADED HOLES OF THE SPLINE MANDREL. INSTALL THE TWO SET SCREWS AND TORQUE. (REFER TO TORQUE CHART FOR THE PROPER VALUES).



TOOL SIZE	KEY SIZE
1 13/16 x 1 1/2	5/32
2 1 1/4 x 11/16	3/16
3 1 1/8 x 1 1/4	1/4
3 3/4 x 1 15/16	1/4
4 1 1/4 x 2 1/8	1/4
4 3/4 x 2 1/4	5/16
6 1 1/4 x 2 1/4	3/8
7 3/4 x 3	3/8

8 7 6 5 4 3 2 1

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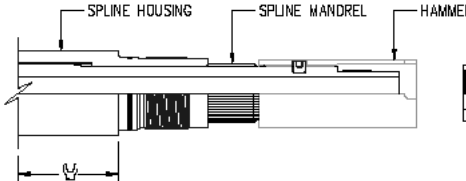
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FLOW MANDREL SECTION
3 1/8 O.D. AND SMALLER

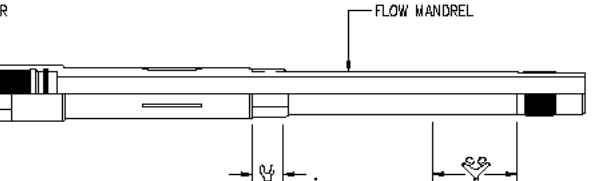


PLACE AN 'O'RING IN THE 'O'RING GROOVE OF THE FLOW MANDREL BOX.

LUBRICATE THE 'O'RING AND BOX THREADS ON THE FLOW MANDREL WITH SILICON OIL AND THREAD IT ONTO THE SPLINE MANDREL PIN.

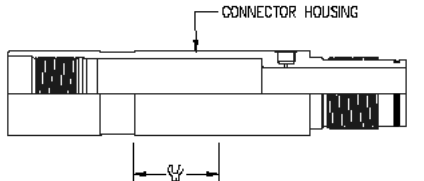
A SUPPORT STAND MUST BE PLACED UNDER THE FLOW MANDREL WHILE TORQUING THIS CONNECTION.

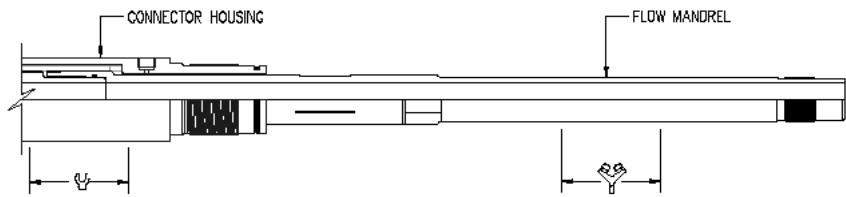
USING A HEX WRENCH, TORQUE THIS CONNECTION (REFER TO TORQUE CHART FOR PROPER VALUES).



LUBRICATE THE 'O'RING AND THREADS ON THE CONNECTOR HOUSING BOX AND SPLINE HOUSING PIN WITH SILICON OIL. SCREW THE CONNECTOR HOUSING ONTO THE SPLINE HOUSING PIN UNTIL THE 'O'RING OF THE CONNECTOR HOUSING PIN IS ENGAGED. AS THE SHOULDER NEARS, POSITION THE FLUID PLUG PORT SO THAT IT POINTS UP. APPLY KOPPER KOTE (SEE SECTION #60.010) TO THE SHOULDERS PRIOR TO FINAL MAKE-UP.

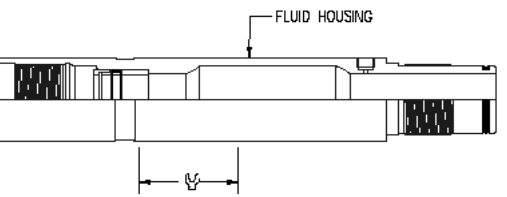
DO NOT ALLOW KOPPER KOTE TO CONTAMINATE THE FLUID WETTED PARTS.





PLACE AN 'O'RING AND BACK-UP RING IN THE 'O'RING GROOVE OF THE CONNECTOR HOUSING PIN.

THE BACK-UP RING MAY NEED TO BE SCARF CUT PRIOR TO ASSEMBLY. (SEE PRE-ASSEMBLY SECTION)



LUBRICATE THE 'O'RING, THE FLOW MANDREL POLISHED SURFACE, THE FLUID HOUSING SEALS, THE THREADS ON THE FLUID HOUSING BOX AND CONNECTOR HOUSING PIN WITH SILICON OIL. INSERT AND THREAD THE FLUID HOUSING ONTO THE CONNECTOR HOUSING PIN UNTIL THE 'O'RING OF THE CONNECTOR HOUSING PIN IS ENGAGED.

CARE SHOULD BE TAKEN TO MAINTAIN THE PRE-ASSEMBLED FLUID HOUSING SEALS IN PLACE DURING ASSEMBLY.

AS THE SHOULDER NEARS, POSITION THE FLUID PLUG PORT SO THAT IT POINTS UP. APPLY KOPPER KOTE (SEE SECTION #60.010) TO THE SHOULDERS PRIOR TO FINAL MAKE-UP.

DO NOT ALLOW KOPPER KOTE TO CONTAMINATE THE FLUID WETTED PARTS.

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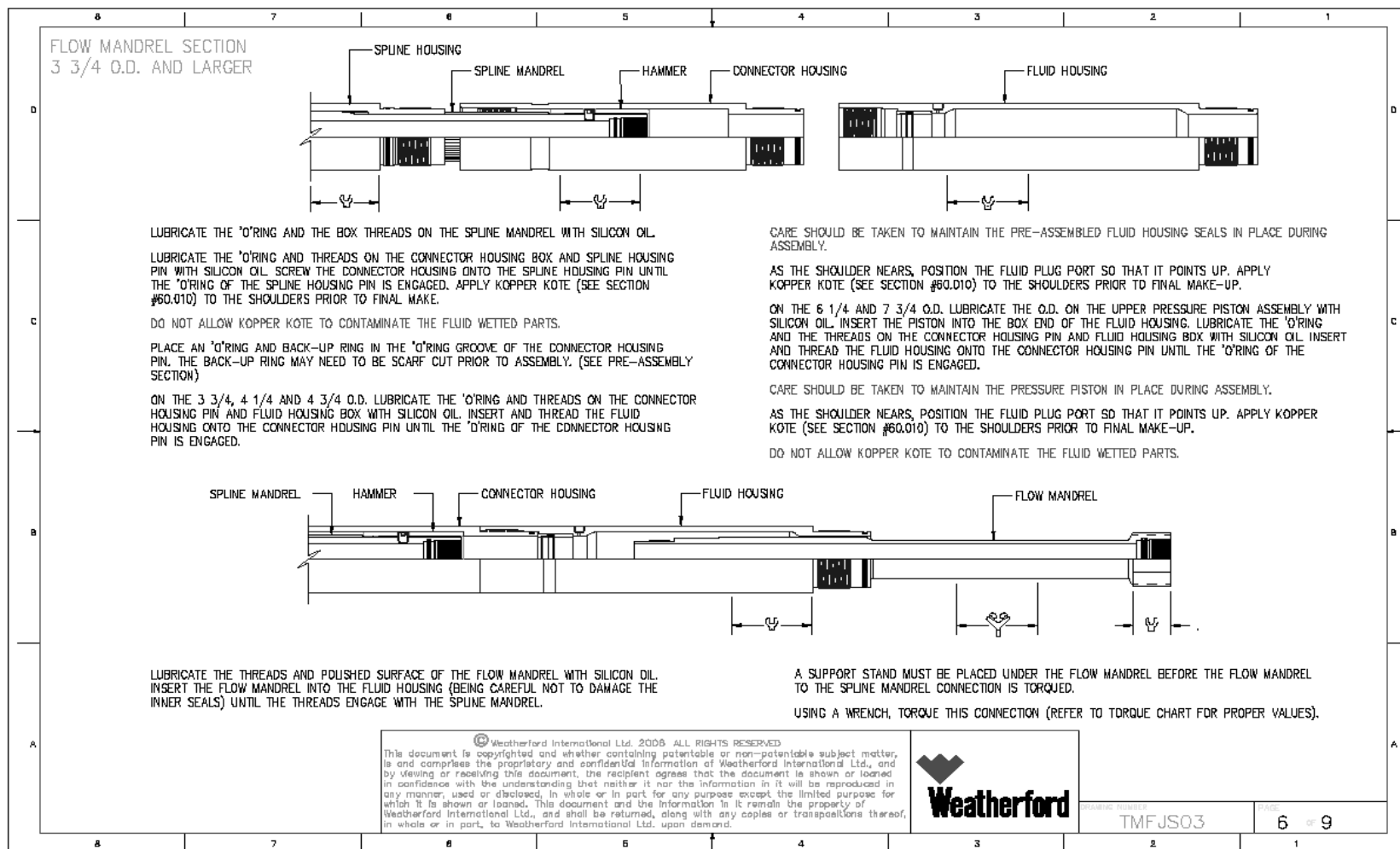
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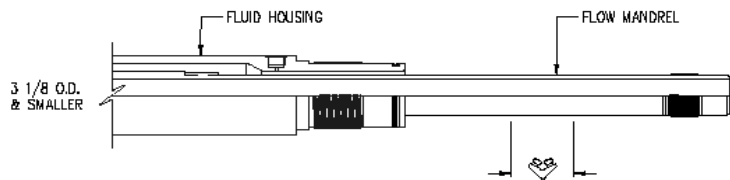
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WASH MANDREL SECTION



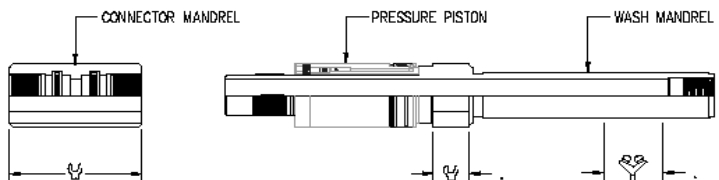
PLACE AN 'O'RING AND BACK-UP RING IN THE 'O'RING GROOVE ON THE FLUID HOUSING PIN. THE BACK-UP RING MAY NEED TO BE SCARF CUT PRIOR TO ASSEMBLY. (SEE PRE-ASSEMBLY SECTION)

PLACE AN 'O'RING AND BACK-UP RINGS IN THE 'O'RING GROOVES OF THE CONNECTOR MANDREL.

LUBRICATE THE 'O'RINGS AND THREADS ON THE FLOW MANDREL PIN AND THE ENTIRE I.D. OF THE CONNECTOR MANDREL WITH SILICON OIL. THREAD THE CONNECTOR MANDREL ONTO THE FLOW MANDREL PIN UNTIL THE 'O'RING OF THE CONNECTOR MANDREL BOX IS ENGAGED.

A SUPPORT STAND MUST BE PLACED UNDER THE FLOW MANDREL WHEN TORQUING THIS CONNECTION.

USING A HEX WRENCH, TORQUE THIS CONNECTION (REFER TO TORQUE CHART FOR PROPER VALUES).



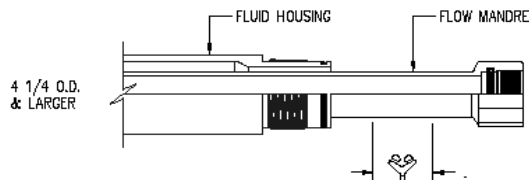
INSTALL THE PRESSURE PISTON ASSEMBLY ON THE O.D. OF THE WASH MANDREL.

LUBRICATE THE PRESSURE PISTON ASSEMBLY AND WASH MANDREL PIN WITH SILICON OIL. THREAD THE WASH MANDREL INTO THE CONNECTOR MANDREL BOX UNTIL THE 'O'RING OF THE CONNECTOR MANDREL BOX IS ENGAGED.

A SUPPORT STAND MUST BE PLACED UNDER THE FLOW MANDREL AND THE WASH MANDREL WHEN TORQUING THIS CONNECTION.

USING A HEX WRENCH, TORQUE THIS CONNECTION (REFER TO TORQUE CHART FOR PROPER VALUES).

NEVER PLACE A WRENCH ON THE POLISHED SURFACE OF THE WASH MANDREL.

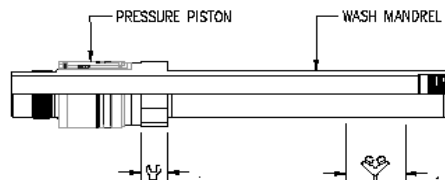


PLACE AN 'O'RING AND BACK-UP RING IN THE 'O'RING GROOVE ON THE FLUID HOUSING PIN. THE BACK-UP RING MAY NEED TO BE SCARF CUT PRIOR TO ASSEMBLY. (SEE PRE-ASSEMBLY SECTION)

PLACE AN 'O'RING AND BACK-UP RINGS IN THE 'O'RING GROOVE IN THE FLOW MANDREL BOX.

INSTALL THE PRESSURE PISTON ON THE O.D. OF THE WASH MANDREL.

LUBRICATE THE 'O'RING AND THREADS ON THE FLOW MANDREL BOX AND WASH MANDREL PIN WITH SILICON OIL. THREAD THE WASH MANDREL/PRESSURE PISTON ASSEMBLY INTO THE FLOW MANDREL BOX.



A SUPPORT STAND MUST BE PLACED UNDER THE FLOW MANDREL AND THE WASH MANDREL WHEN TORQUING THIS CONNECTION.

USING A HEX WRENCH, TORQUE THIS CONNECTION (REFER TO TORQUE CHART FOR PROPER VALUES).

NEVER PLACE A WRENCH ON THE POLISHED SURFACE OF THE WASH MANDREL.

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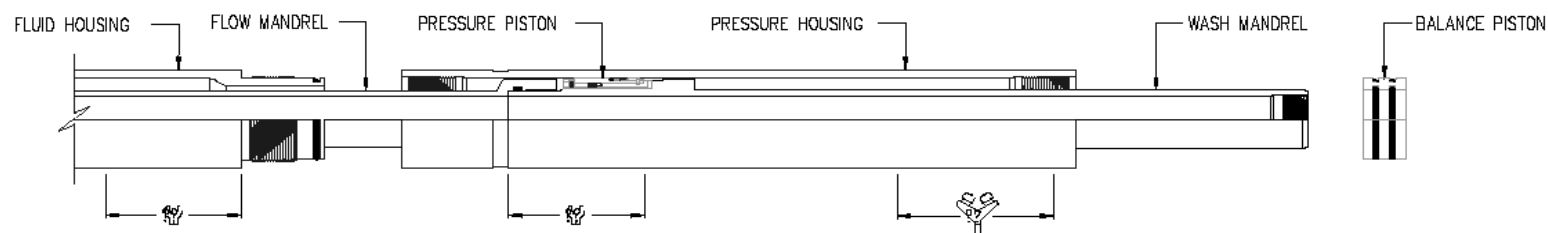
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PRESSURE HOUSING SECTION



LUBRICATE THE PRESSURE PISTON 'O'RINGS AND THE THREADS ON BOTH THE FLUID HOUSING PIN AND PRESSURE HOUSING BOX WITH SILICON OIL. SLIDE THE PRESSURE HOUSING ONTO THE PRESSURE PISTON BEING CAREFUL NOT TO DAMAGE THE PRESSURE PISTON SEAL AREA. THREAD THE PRESSURE HOUSING ONTO THE FLUID HOUSING PIN UNTIL THE 'O'RING OF THE FLUID HOUSING PIN IS ENGAGED. APPLY KOPPER KOTE (SEE SECTION #60.010) TO THE SHOULDERS PRIOR TO FINAL MAKE-UP.

DO NOT ALLOW KOPPER KOTE TO CONTAMINATE THE FLUID WETTED PARTS.

THOROUGHLY LUBRICATE THE ENTIRE BALANCE PISTON WITH BG GREASE AND INSTALL ONTO THE WASH MANDREL. INSERT IT INTO THE PRESSURE HOUSING USING THE FILLER NUT.

PROCEED TO FILLING SECTION.

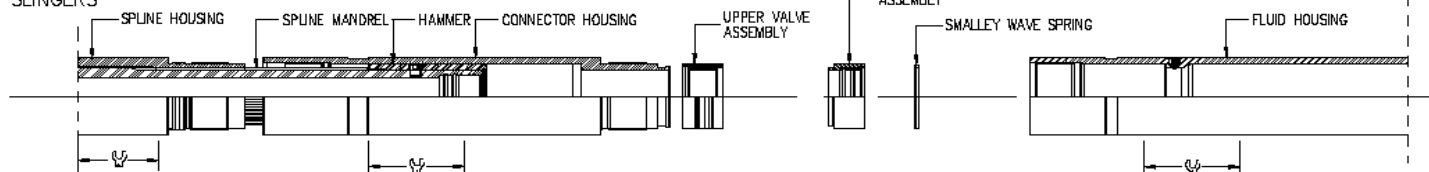
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FLOW MANDREL SECTION MODIFIED SLINGERS



LUBRICATE THE 'O'RING AND THE BOX THREADS ON THE SPLINE MANDREL WITH SILICON OIL.

CARE SHOULD BE TAKEN TO MAINTAIN THE PRE-ASSEMBLED SMALLEY WAVE SPRING IN PLACE DURING

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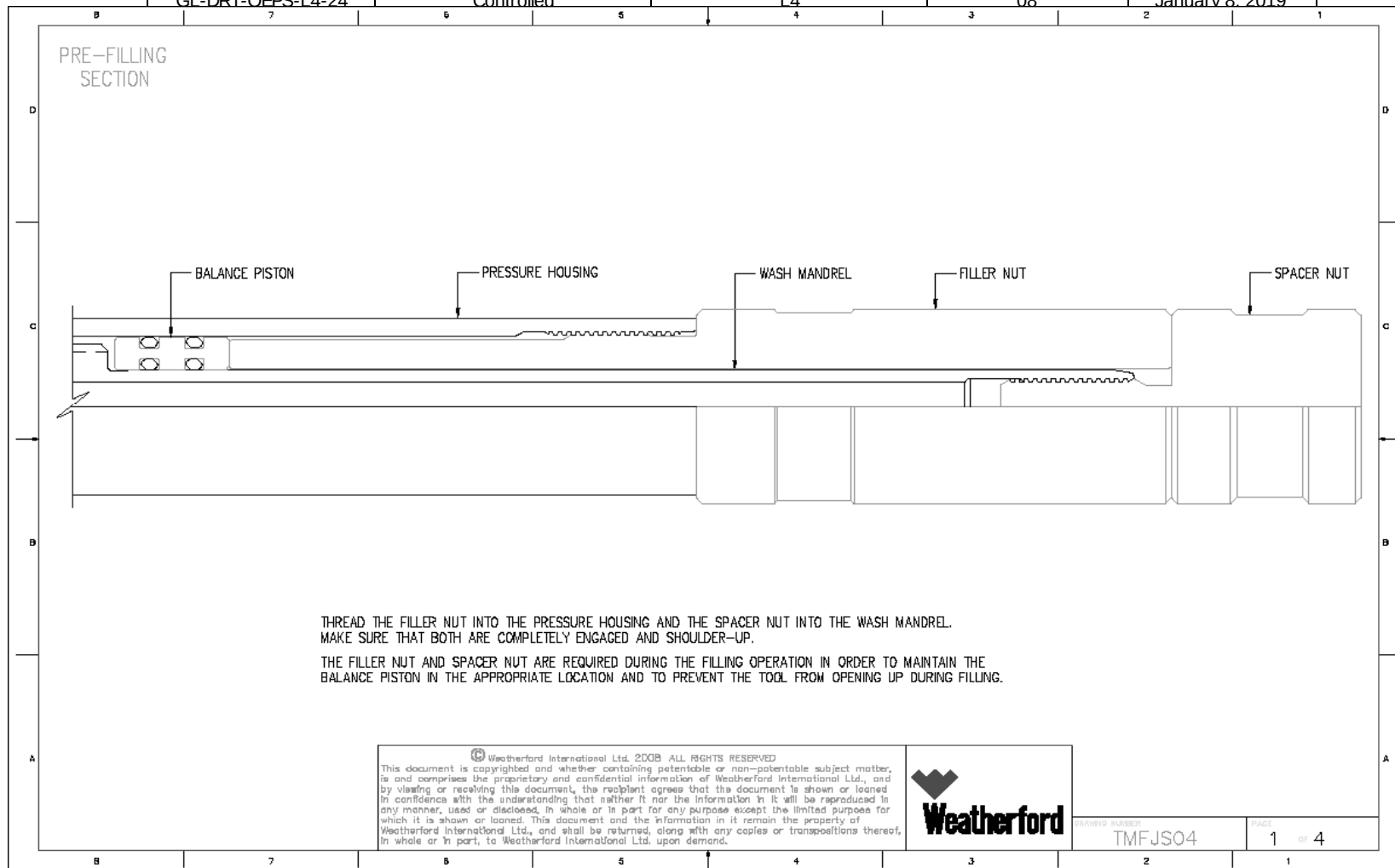
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CHAPTER: 70.000- FILLING

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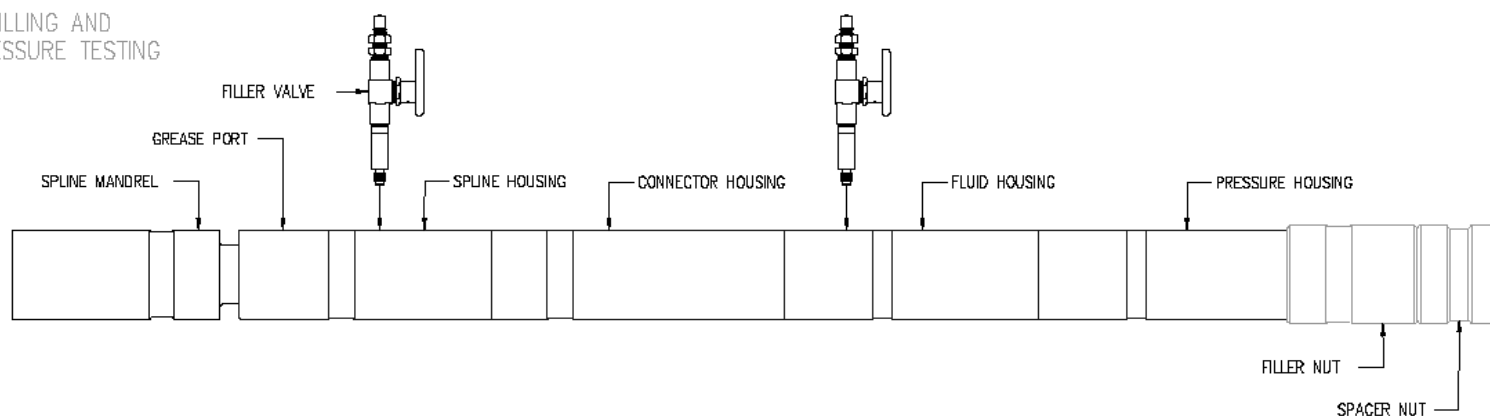


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FILLING AND PRESSURE TESTING



ON THE 3 3/4 O.D. AND LARGER, ATTACH A FILLER VALVE TO THE FLUID PLUG PORT IN THE SPLINE HOUSING AND FLUID HOUSING.

ON THE 3 1/8 O.D. AND SMALLER, ATTACH A FILLER VALVE TO THE FLUID PLUG PORT IN THE CONNECTOR HOUSING AND FLUID HOUSING.

ON THE 3 3/4 O.D. AND LARGER ATTACH THE PRESSURE LINE FROM THE FILLER TANK TO THE VALVE IN THE FLUID HOUSING AND THE RETURN LINE FROM THE FILLER TANK TO THE VALVE IN THE SPLINE HOUSING.

ON THE 3 1/8 O.D. AND SMALLER, THE RETURN LINE WILL BE FROM THE VALVE IN THE CONNECTOR HOUSING.

SLOWLY PUMP OIL (SEE SECTION #110.050) INTO THE TOOL UNTIL A CONTINUOUS FLOW OF OIL, WITHOUT ANY AIR BUBBLES, IS COMING OUT OF THE RETURN LINE. RAISE THE SLINGER AT AN ANGLE (AT LEAST 15°) SO THAT THE SPLINE HOUSING IS ELEVATED.

CONTINUE TO SLOWLY PUMP OIL INTO THE TOOL UNTIL A CONTINUOUS FLOW OF OIL, WITHOUT ANY AIR BUBBLES, IS COMING OUT OF THE RETURN LINE. DURING THIS PROCESS PERIODICALLY TURN THE PUMP OFF TO ALLOW COMPLETE AIR REMOVAL.

SWITCH THE HOSES FROM THE TWO VALVES. AS OIL IS BEING PUMPED INTO THE TOOL, GRADUALLY ROCK THE SLINGER UP AND DOWN TO REMOVE ANY REMAINING AIR THAT MIGHT BE TRAPPED IN THE TOOL.

ONCE COMPLETELY FILLED, CLOSE THE RETURN LINE VALVE AND PRESSURE THE TOOL TO 1,000 PSI. THIS WILL ASSURE THAT ALL SEALS ARE OPERATIONAL.

IF THE TOOL FAILS TO PRESSURE UP DURING THIS PROCEDURE, AN 'O'RING IS NOT SEALING PROPERLY. THE TOOL MUST BE DISASSEMBLED AND THESE AREAS EXAMINED.

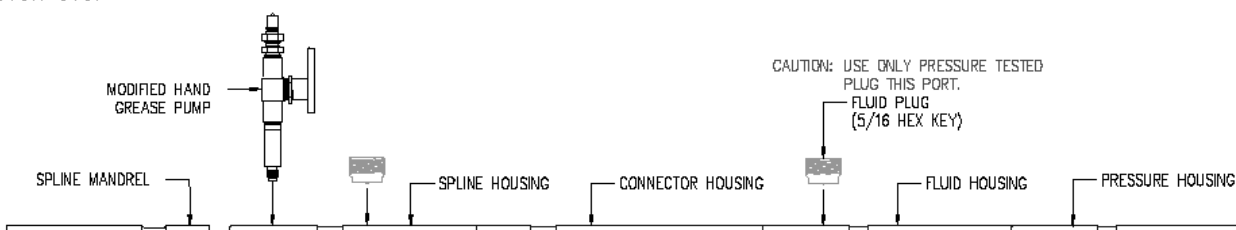
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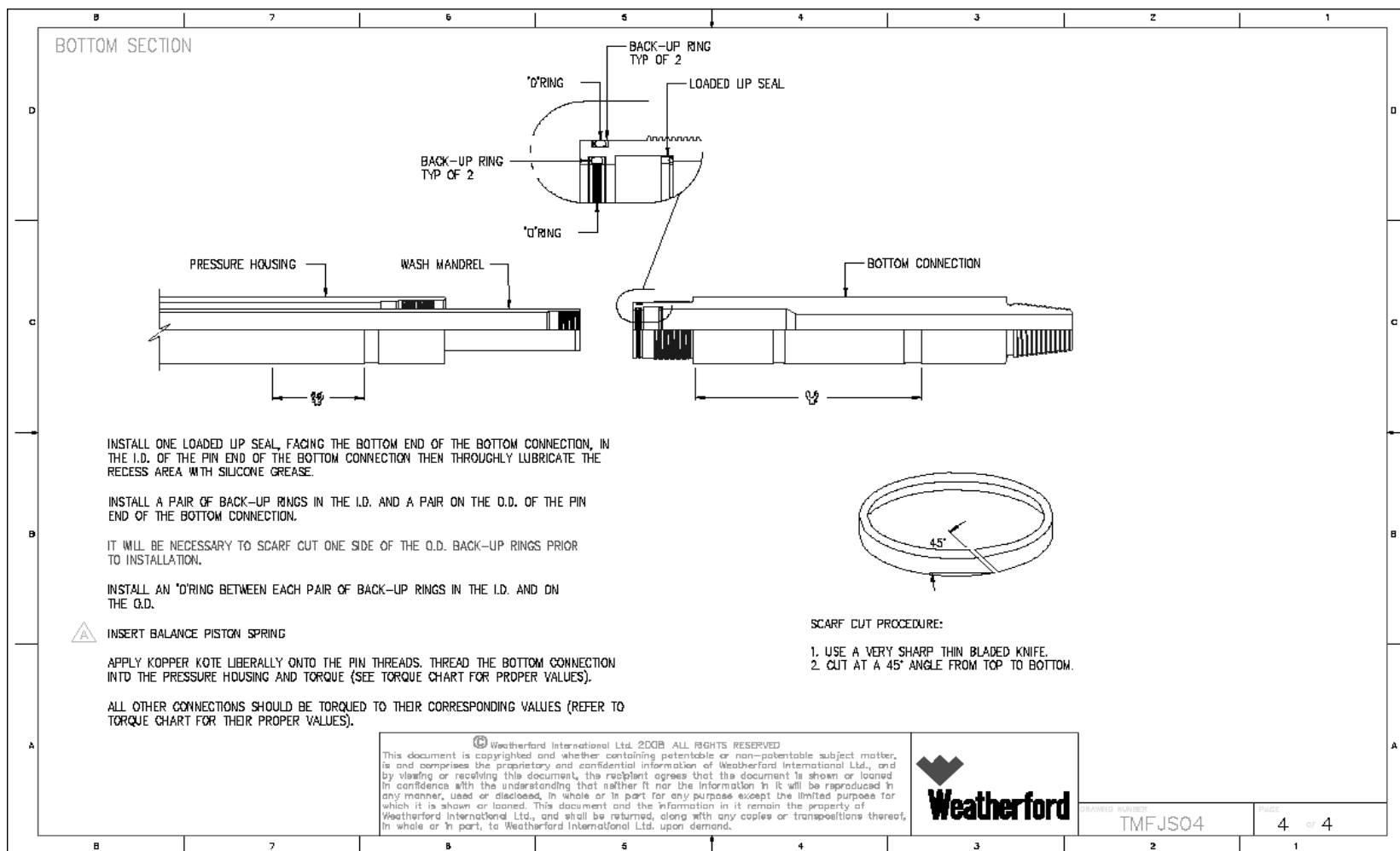
FLUID PORT & PISTON STOP



CAUTION: USE ONLY PRESSURE TESTED PLUG THIS PORT.
FLUID PLUG (5/16 HEX KEY)

ment is
or any

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CHAPTER: 80.000 – TESTING

80.010 – Pre-Repair Test Procedure

1. Visually check the Slinger for any damage or missing Fluid Plugs. If a plug is missing, the Slinger cannot be rack tested.
2. Steam clean the I.D. thoroughly from both ends. Clean both box and pin and the polished surface on the Spline Mandrel.
3. Place the Slinger in the testrack and follow the Rack Testing Procedure outlined in Chapter #80.020.
4. Record travel distance and compare with the latest redress report (History File). If the travel distance outside the published tolerance per the chart in Section 80.020, check the following:
 - a. Make sure tool is filled completely.
 - b. Lapped surfaces of Lower Pressure Piston and Check Valve Plate.
 - c. O-rings on Pistons.
 - d. Peek Ring Seal Area.
5. After the Slinger has reached its travel distance, verify that the tool is slowly metering open. If it is not metering, inspect Viscos for damage.

 NOTE	NOTE
	• All dirty tools must be tested a minimum of three times.

80.020 – Rack Testing Procedure

Place the slinger in testrack. Attach an air hose to the bottom pin test nipple. There should be a minimum of 100 -psi air pressure in order to test the tool.

 CAUTION	CAUTION
	• Do not attach the air to the slinger before it is placed in the test rack. • Disregard can lead to minor injury.

Set the test rack to the appropriate pressure given on the Pressure Chart. As the test rack pump gauge reaches the set pressure, the mandrel will pull out to the D2 position. Record the D2 distance between the face of the Spline mandrel and the face of the Spline Housing.

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TEST RACK PRESSURE CHART	
OD SIZE (INCHES)	PRESSURE (PSI)
1-13/16	250
2-1/4	500
3-1/8	500
3-3/4	500
4-1/4	1000
4-3/4	1000
6-1/4	1000
6-1/2	1000
7-3/4	1000
8	1000

If the travel distance is substantially less than or greater than the values in the "HyPulse Fishing Jar Slinger Travel Distance" chart, check the following:

- Make sure tool is filled completely.
- Lapped surfaces of Lower Pressure Piston and Wash Mandrel.
- O-rings on pistons.
- Peek Ring Seal Area.
- After tool has reached its overall distance, verify that the tool is slowly metering open. If it is not metering, inspect Viscos for damage.
- Actuate the Slinger 10 times to ensure a consistent travel distance.

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HYPULSE FISHING JAR SLINGER TRAVEL DISTANCE

ALL SLINGERS TESTED AT CHARTED PRESSURE	
SIZE (INCHES) +/- 1/2"	
1-13/16	4
2-1/4	5 1/4
3-1/8	4-7/8
3-3/4	5
4-1/4	5-1/2
4-3/4 x 2-1/4	5-1/4
6-1/4 x 2-1/4	4-1/2
6-1/2 x 2-3/4	4-1/2
7-3/4 x 3	4-1/4
8 x 3	4-1/4

 NOTE	NOTE
	On the 3-1/8, 3-3/4, 4-1/4 and 4-3/4 tools that have not been modified this will be your test lengths at charted press.

ALL SLINGERS TESTED AT CHARTED PRESSURE +/- (1/2")	
SIZE (IN)	TEST LENGTH (IN)
3 1/8 (1525)	3 1/2
3 3/4 (1528)	3 3/4
4 1/4 (1523)	3 11/16
4 3/4 (1524)	4

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CHAPTER: 90.000 - SPECIAL INSTRUCTIONS

90.010 – Lapping Procedure

The purpose of lapping each surface is to insure that each surface is flat, allowing for an effective seal. If the two (2) lapped surfaces do not seal properly, the tool will not function.

1. After the Pressure Piston has been disassembled, it should then be cleaned in solvent and blown dry.
2. Visually check each lapped surface for any damage. If surfaces are damaged, refer to procedure Step 6. If all surfaces appear to be in good condition, then apply bluing to all lapped surfaces and allow it to dry completely.
3. When lapping the Lower Pressure Piston, apply the lapping compound to the lapped surface of the Wash Mandrel only.

 NOTE	NOTE
	• Do not lap mating surfaces without lapping compound due to the possibility of galling the parts.

4. Lap each mating surface with 280 grit lapping compound until all of the bluing is gone. Under certain conditions it may be necessary to keep reapplying the compound to sufficiently remove the bluing.
5. If the surfaces have been damaged either by drilling mud or steel particles, it will be necessary to begin lapping with 100-grit compound. While using this grit of compound, it is not necessary to blue the lapped surfaces. Once the dings or nicks are lapped out, 280 grit lapping compound can be used to smooth up the surfaces. After the 280-grit compound has been used once, the surfaces should then be blued and relapped using the 500-grit compound on all tool under 4-3/4" and 280-grit compound on all tools 4-3/4 and larger, until all bluing is gone. Under no circumstance shall any surface be lapped with only 100-grit compound.
6. All new parts must be lapped with its mating surface before assembly to ensure a positive seal.
7. Once all surfaces are lapped and all the bluing has been removed, the parts should be thoroughly cleaned to remove any excess compound. The parts should then be stored in a clean environment prior to assembly.

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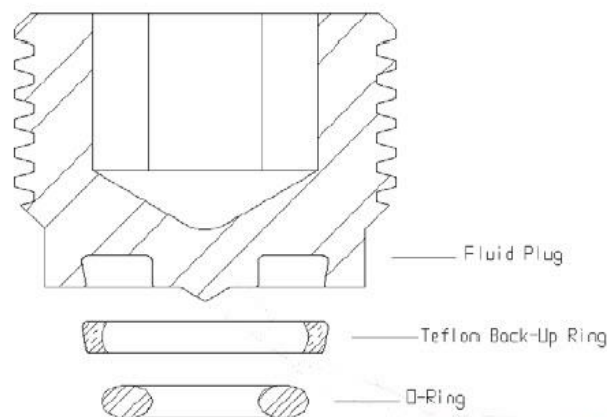
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90.020 – Fluid Plug Assembly

Each fluid plug consists of the plug itself, a Teflon Back-Up Ring and an O-Ring. Insert the Teflon Back-Up Ring into the Fluid Plug so that the larger tapered edge goes in first. Insert the O-Ring, insuring that it is properly seated in both the back-up ring and plug.

 NOTE	NOTE
	Be sure that the o-ring has been installed properly to eliminate the possibility of oil leakage.

One (1) of the Fluid Plugs in the Service Kit will come screwed into a “WHITE” cap. This Fluid Plug has been pressure tested and should be installed in the Pressure Housing. Install the remaining Fluid Plugs in the Spline and Balance Housings and torque (refer to chart for proper torque).



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90.030 – Installation/Extraction of Lee Inserts and Pins

Installation Procedure:

 NOTE	NOTE
	See assembly drawing for information and orientation. See chart for pin and insert body thread sizes.

1. Thoroughly soak Pressure Piston in cleaning solvent to free any unwanted debris. Blow dry with air.
2. Using the proper size Reamer; ream the holes, being sure to remove any foreign material.
3. Repeat step 1.
4. Thread the Insert Body onto the Body Tool.
5. Push, DO NOT HAMMER, the Insert Body until it is seated against the 45° shoulder. Remove the Body Tool.
6. Thread the Pin completely onto the Installation Tool.

 NOTE	NOTE
	It may be necessary to chase or replace the threaded set screw of the installation tool at this time.

7. Drive the Pin into the body until the pin is flush with the body.
8. Remove Installation Tool.

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Extraction Procedure:

Lee Pin (0.187 Visco or Jeva Jets) Removal - Rivet Tool Method

1. Tap the threads of the pin to be removed. Chase the threads of the Extractor Stud.
2. Thread the stud into the Pin.
3. Slide the sleeve down over the stud until it is seated against the end of the body.
4. Engage the Pin end of the stud with the Rivet Tool and squeeze the handle until the Pin is free.
5. Remove and discard the Pin.

Lee Pin (0.281 PRV and 0.375 Check) Removal – T-Handle Method

 NOTE	NOTE
	• The only time the pressure relief valves and check valves should be removed is when the hydraulic fluid has been contaminated or the pressure piston has been scrapped out.

6. Tap the thread of the pin to be removed. Chase or remove the threaded set screw of the extraction stud.
7. Holding the T-handle, turn the drive nut clockwise until the threads are fully exposed from the extractor guide sleeve. Thread the stud into the pin.
8. Holding the T-handle, turn the drive nut counter clockwise until the face of the extractor guide sleeve rest against the insert body.
9. Grasping the T-handle, use an open end wrench to turn the drive nut counter clockwise until the pin is free.
10. Turn the drive nut clockwise until the pin is exposed from the extractor guide sleeve. Remove and discard the pin.

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Lee Insert Body Removal – (0.187, 0.281, and 0.375 Diameter Insert Bodies)

1. Tap the threads of the Insert Body to be removed. Chase the threads of the Body Tool.
2. Slide the striker onto the Body Tool and thread the Body Tool completely into the pin.
3. Strike the head of the Body Tool with the Striker until the Pin is removed.

 NOTE	NOTE
	• It may be necessary to tighten the body tool to the insert body after several hits.

THREAD SIZE		
BODY DIAMETER	PIN Inst. /Extr. Tools Thread Size	BODY Inst. /Extr. Tools Thread Size
0.187 (Visco or Jeva Jet)	4-40 UNC	8-36 UNF
0.281 (Pressure Relief Valves)	6-40 UNF	1/4-48 Special
0.375 (Check Valve)	1/4-32 Special	5/16-24 UNF

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90.040 – Visco Testing / Back Flushing

- There are two separate Test Assembly units, one for the Visco jets and the other for the Jeva Jets.
- The Test Assembly Number for the Visco Jet is T123000.
- The Test Assembly Number for the Jeva Jet is T122000.

 NOTE	NOTE
	• The individual service centers will have to order the above test assemblies.

The testing procedure is almost the same for each unit:

The Adapter (B) at the end of the Test Unit must be unscrewed to place the Jet in the Adapter (A). You place the Visco Jet in the Adapter (A) with the nose of the Jet pointing in the direction of the Arrow that is stamped on the Adapter (B). Make sure that the Female portion of the Adapter (B) has the O-Ring (D) located in the bottom. The Arrow on the Adapter (B) must be pointing away from the fitting (3) that go into the filling unit. Place the Fitting (3) in the Filler unit and pressurize to 1000 PSI. Collect the flow from the Visco in an ml, container and compare the rate to the proper Visco on page 3.

When testing the Jeva Jet, you screw the small plug unit (marked Jeva only) into the Jeva Jet and place the Jet into the Adapter the same way as the Visco Jet.

When you want to back flush either the Visco or Jeva jets the placement of the Jets in the Adapter (A) and (B) is the same. The Adapter Assembly must be turned around, so that the Arrow on the Adapter (B) is pointed toward the Fitting (3) that go into the filling unit, place the Fitting (3) in the filling unit and pressure to 1000 PSI. The Jet will start to flow, let it flow for about 30 seconds; this will clean the jet for use in the Tool. If the Jet does not flow then the Jet is completely plugged remove it from the Adapter Assembly, throw away the Jet.

Page 2, Shows the assembly of both the Test units, and Adapter.

Page 3, Has the information on the Flow Rates for each part. The Flow rates are calculated for the amount of time that it takes for the Jet to flow 10 ml of oil. This time can vary 10% either plus or minus. This 10% variation reflects the tolerance on the Jets.

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VISCO TESTING / BACK FLUSHING (Flow Rate)

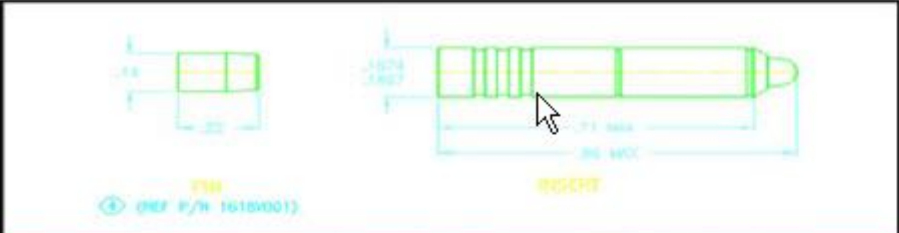
Part Number	162241011	162241012	1464V125H	1464V160H	1464V248H	1464V800H	1464V313H
Lohm Rate	41000	198000	12500	16000	24800	800000	313000
Time in seconds to flow 100 ML	103	496	32	40	62	200	784
Time in seconds to flow 50 ML	51	248	40	20	31	100	392
Time in seconds to flow 10 ML	10	50	62	4	6	20	78
Max 10 ML	11	55	200	4.4	6.6	22	85.8
Min 10 ML	9.5	47.5	784	3.8	5.7	19	74.1

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ACCEPTABLE ALTERNATIVE VENDOR PART NUMBERS



TO BUILD A PART NUMBER: ADD TO THE DRAWING NUMBER "1464N" A FOUR DIGIT NUMBER CONSISTING OF THE LAST FOUR DIGITS FROM THE VENDOR'S PART NUMBER
EXAMPLE : 1464N0001

PART NUMBER	LOHM RATE	TOL	MINIMUM PASSAGE	VENDOR NUMBER	ACCEPTABLE ALTERNATE VENDOR NUMBERS	REV
1464N125H	12500	10%	.019	JEVA1845125H	JEVA1845119H JEVA1845125H JEVA1845133H JEVA1845152H JEVA1845160H JEVA1845188H	3
1464N150H	15000	10%	.019	JEVA1845150H	JEVA1845150H JEVA1845152H JEVA1845160H JEVA1845188H	
1464N248H	24800	10%	.013	JEVA1830248H	JEVA1830248H JEVA1830256H JEVA1830248H JEVA1830268H JEVA18302762H JEVA18302800H JEVA18302840H JEVA1830298H	
1464N300H	30000	10%	.009	JEVA18302800H	JEVA18302800H JEVA18302840H JEVA1830298H JEVA1830313H	5

CHAPTER: 100.000 - TROUBLE SHOOTING

100.010 – Wash Mandrel and Flow Mandrel Removal

- On the 4-1/4" O.D. and larger tools, while attempting to break out the Wash Mandrel, if the Flow Mandrel connection breaks instead, the following procedure must be used:
- Break and remove the Fluid Housing.
- Place the Wash Mandrel Socket onto the floor vise.
- Slide the Wash Mandrel into the Socket until the Hex is engaged.
- Break the Wash Mandrel/Flow Mandrel connection with the Hex Wrench.

	NOTE
	Flow mandrel needs to have support when breaking connection.

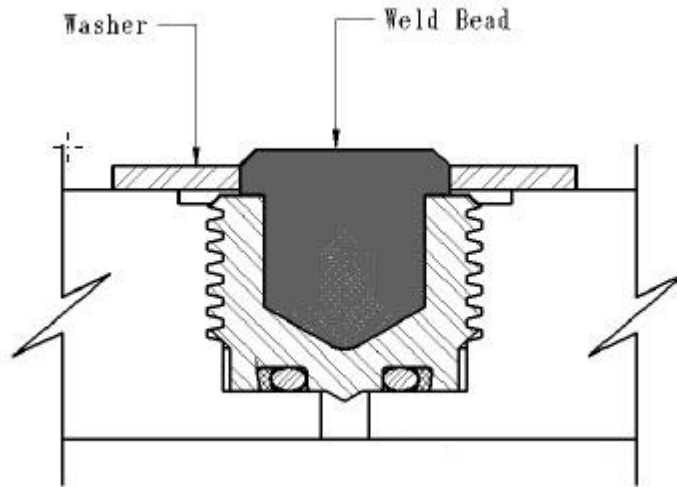
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100.020 – Fluid Plug Removal

Most Fluid Plugs are easily removed by using an appropriate hex key wrench and break over bar. If the hex socket has been deformed, the plug can be removed by welding a flat washer to the Fluid Plug. The Fluid Plug can then be removed with the use of a pipe wrench to grasp the washer.



100.030 – Fluid Plug Removal with Heat

If any of the Fluid Plugs cannot be removed with use of a break over bar combined with a cheater pipe, heat might need to be applied to the Fluid Plug for removal. Another possibility is that torque lock adhesive was applied to the Fluid Plug during assembly, also requiring the application of heat for removal. The area around the Fluid Plug should be heated evenly, not to exceed 650° F (343 C). This is to be controlled and verified with the use of appropriately rated heat sticks. Fluid Plug removal should be attempted intermittently while bringing the area up to temperature. Once the Fluid Plug is removed, allow the housing to cool slowly.

100.040 – Oversized Fluid Plug

During the removal of the Fluid Plugs, a Fluid Plug Port may be damaged beyond conventional thread repair. If this is the case, the 5/8-18UNF (P/N 1431000A) Fluid Plug Kit will need to be replaced with a 3/4-16UNF (P/N 1458000A) Fluid Plug Kit. The Fluid Plug Port will also need to be reworked, using the Rework Drawing in Chapter #120.040, to incorporate this change.

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CHAPTER: 110.00 - GENERAL TOOL INFORMATION

110.010 – Shipping and Storage Preparation

SHIPPING:

1. Never place tie-down chains over chromed surfaces.
2. Never place tie-down chains over mandrel unless the mandrel has a support board under it.
3. All chains must be within 2-3" of support board.
4. All exposed threads must have a thread protector in place.

STORAGE:

1. Remove the test rack nipples and drift the I.D. (inside diameter).
2. Grind all teeth marks left by the tongs or vise.
3. Clean with Varsol, include the box and pin connections. After cleaning, all housings need to be individually measured and recorded on a tally sheet. Overall length of the tool also needs to be recorded. Measure O.D. of all the housings and compare to the minimum O.D. allowed for that particular tool. Record these O.D. measurements on the tally sheet.
4. Re-stamp Serial Numbers, Heat Codes, and other data as required. Record Heat Codes on Tool History Log.

Paint the tool Weatherford Red with Spline Mandrel Box end and the Bottom Connector painted white. Stencil with white spray paint the following information:

- Serial number
- O.D. x I.D.
- Type of tool
- Box and Pin connection
- Box and Pin O.D. of Upper, Lower Connector
- Place thread protectors on the exposed threads then store for shipping.

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110.020 – Torque Chart

All torque should be applied at right angles to the parts being torqued. For Fluid Plugs and Set Screws, use an adjustable Torque Wrench.

O.D. Size inches	1-13/16	2-1/4	3-1/8	3-1/8	3-3/4	3-3/4	4-1/4	4-3/4	6-1/4	6-1/2	7-3/4	8
All Housings ft.-lbs.	750	1,500	3,000	3,000	3,000	3,000	6,000	12,000	18,000	18,000	32,000	32,000
Spline Mandrel To Flow Mandrel ft.-lbs.	150	800	700	700	700	700	1,100	1,400	2,800	4,000	4,200	4,200
Flow Mandrel To Wash Mandrel ft.-lbs.						500	700	1,100	2,100	3,000	2,800	2,800
Flow Mandrel To Connector Mandrel ft.-lbs.	100	500	500	500	-	-	-	-	-	-	-	-
Connection Mandrel To Wash Mandrel ft.-lbs.	100	500	500	500	-	-	-	-	-	-	-	-
Hammer Set Screws ft.-lbs.	20	25	50	25	50	50	50	60	90	125	90	90
Socket Head Cap Screws ft.-lbs.	5	5	6	6	-	6	18	18	18	18	18	18
Fluid Plugs ft.-lbs.	60	60	60	60	65	65	65	70	80	95	80	80

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110.030 – Assembly / Disassembly Tools

Hypulse Fishing Jar Slings Assembly/Disassembly Tools

DESCRIPTION	1-13/16"x1/2" (1529)	2-1/4"x11/16" (1530)	3-1/8"x1-1/4" (1525)	3-1/8"x1-1/2" (1623)	3-3/4"x1-15/16" (1528) Old Style	3-3/4"x1-15/16" (1528) New Style	4-1/4"x2-1/8" (1523)
Hex Wrench (Flow Mandrel)	A563000 (13/16" Hex)	A569000 (1-1/8" Hex)	A570000 (1-5/8" Hex)	A700000 (1-7/8" Hex)	A326000 (2-7/8" Hex)	A326000 (2-7/8" Hex)	A551000 (3-1/4" Hex)
(Wash Mandrel)	A569000 (1-1/8" Hex)	A558000 (1-7/16" Hex)	A554000 (2-1/4" Hex)	A554000 (2-1/4" Hex)	A326000 (2/7/8" Hex)	A326000 (2-7/8" Hex)	A551000 (3-1/4" Hex)
Assembly Filler Nut	A591000	A567000	A441000	A441000	A420000	A420000	A442000
Assembly Spacer Nut	A587000	A443000	A399000	A673000	A230000	A230000	A397000
Peek Ring Installer	A592000	A568000	A553000	A689000	A447000	A447000	A448000
Upper Packing Remover	A595000	A594000	A577000	A577000	A271000	A271000	-
Wash Mandrel Socket	-	-	-	-	A670000	A670000	A598000
Seal Installer (Connector Mandrel)	A602000	-	-	-	--	-	-
Drifts	G897001	G897003	G897006	G897016	G897007	G897007	G897010

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HyPulse Fishing Jar Slings Assembly/Disassembly Tools

DESCRIPTION	4-3/4"x2-1/4" (1524)	6-1/4"x2-1/4" (1526)	6-1/2" x 2-3/4" (1521)	7-3/4" x 3" (1527)	8"x3" (1522)
Hex Wrench (Flow Mandrel)	A555000 (3-1/2" Hex)	A324000 (3-7/8" Hex)	A321000 (4-3/8" Hex)	A352000 (5" Hex)	A352000 (5" Hex)
(Wash Mandrel)	A555000 (3-1/2" Hex)	A324000 (3-7/8" Hex)	A321000 (4-3/8" Hex)	A352000 (5" Hex)	A352000 (5" Hex)
Assembly Filler Nut	A437000	A596000	A643000	A616000	A616000
Assembly Spacer Nut	A393000	A393000	A642000	A610000	A610000
Assembly Spacer Sleeve	-	-	A644000	-	-
Peek Ring Installer	A449000	A611000	A672000	A593000	A617000
Upper Packing Remover	A328000	A276000	A367000	A360000	A360000
Wash Mandrel Socket	A599000	A622000	A671000	A623000	-
Seal Installer (Connector Mandrel)	-	-	-	-	-
Drifts	G897011	G897011	G897013	G897014	G897014

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110.040 - Approved Silicone Fluids

- Rhodorsil 47v100 Silicone Fluid
- Shim-Etsu Dm-Fluids Grade 100
- Dow Corning 210h
- General Electric Sf96
- Century Silicone Fluid 100 Cst
- ICM Products Inc. SF-100
- Path Silicones TBF 9-100
- Wilsil 100 Silicone oil
- Waker AK100 Silicone Oil

 NOTE	NOTE
	• All lubricants must be approved by the Northwoods Manufacturing Engineering Dept.

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110.050 – Slinger Specifications

HyPulse Fishing Jar Slingers Assembly/Disassembly Tools

Outside Diameter (In.)	1-13/16	2-1/4	3-1/8	3-1/8	3-3/4	3-3/4	4-1/4	4-1/4	4-3/4	6-1/4
Tool Joint Size (api)	1-13/16 Wilson FJ	1-1/4 REG	2-3/8 REG	2-7/8 PAC	2-3/8 IF	2-3/8 EUE	2-7/8 IF	2-7/8 IF	3-1/2 IF	4-1/2 IF
Inside Diameter (api)	1/2	11/16	1-1/4	1-1/2	1-3/4	1-15/16	1-15/16	2-1/8	2-1/4	2-1/4
Tensile Yield * (lbs.)	75,000	110,000	250,000	240,000	275,000	225,000	350,000	325,000	500,000	832,000
Torsional Yield (ft-lb)	1,600	2,500	5,000	5,000	7,800	3,750	15,000	15,000	20,000	49,300
Max. Overpull Up/Down (lbs.)	20,000	30,000	45,000	45,000	45,000	45,000	65,000	55,000	85,000	200,000
Max. Circulating Pressure (psi)	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Max. Hydrostatic Pressure (psi)	None	None	None	None	None	None	None	None	None	None
Min. Housing Torque at Assembly (ft-lb) ¹	750	1,500	3,000	3,000	3,000	3,000	6,000	6,000	12,000	18,000
Max. Housing Torque at Assembly (ft-lb)	825	1,650	3,300	3,300	3,300	3,300	6,600	6,600	13,200	19,800
Total Travel (In.)	5-1/2	6	6-1/8	6	6-1/8	6-1/8	6-1/8	6-1/4	7	8-1/4
Approx. Length Closed (In.)	84	105	118	115	118	118	120	118	118	162
Approx. Weight (Lbs.)	50	100	198	180	242	242	340	316	440	1,000
Max. BHT (°F)	400	400	400	400	400	400	400	400	400	400
Pump Open (Sq. In.)	0.4	0.8	2.4	2.1	4.4	4.4	4.9	5.4	6.5	7.7

¹ – While applying torque to each connection, if the dump valve releases before reaching the housing torque, the process must be performed again until the housing torque is met or exceeded by no more than 10 percent tolerance.

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HyPulse Fishing Jar Slings Assembly/Disassembly Tools

Outside Diameter (in.)	6-1/2	7-3/4	8
Tool Joint Size (API)	4-1/2 IF	6-5/8 REG	6-5/8REG
Inside Diameter (API)	2-3/4	3	3
Tensile Yield * (lb.)	934,000	1,600,000	1,750,000
Torsional Yield (ft-lb)	56,200	100,000	105,000
Max. Overpull Up/Down (lb.)	175,000	260,000	300,000
Max. Circulating Pressure (psi)	5,000	5,000	5,000
Max. Hydrostatic Pressure (psi)	None	None	None
Min. Housing Torque at Assembly (ft-lb) ¹	18,000	32,000	32,000
Max. Housing Torque at Assembly (ft-lb)	19,800	35,200	35,200
Total Travel (in.)	8-1/2	9-3/4	9-3/4
Approx. Length Closed (in.)	153	187	187
Approx. Weight (lb.)	1,500	2,000	2,300
Max. BHT (°F)	4,000	400	400
Pump Open (sq. in.)	10.6	14.2	15.3

¹ – While applying torque to each connection, if the dump valve releases before reaching the housing torque, the process must be performed again until the housing torque is met or exceeded by no more than 10 percent tolerance.

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110.060 – Maximum O.D. Wear Allowance

Nominal Tool O.D.	Min. O.D. Acceptable	Allowable O.D. Wear
1-13/16"	1-25/32"	1/32"
2-1/4"	2-7/32"	1/32"
3-1/8"	3-3/32"	1/32"
3-3/4"	3-23/32"	1/32"
4-1/4"	4-3/16"	1/16"
4-13/16"	4-23/32"	3/32"
6-1/4"	6-3/32"	5/32"
6-1/2"	6-11/32"	5/32"
7-3/4"	7-19/32"	5/32"
8"	7-27/32"	5/32"

110.070 – Gauge / Measuring Equipment / NDT Calibration

I need it to be changed in all manuals to read as follows "All gauges / measuring equipment which are used during the repair and maintenance process needs to be calibrated and certified a minimum of year (1) and every six (6) months if inspecting per DS-1 category (DS-1 vol. 3 section 3.19 jar inspection requirements; a principle six monthly calibration check is required for WMPI power unit gauge (ammeter), blacklight meter (radiometer), field magnetometers/gauss meters and calipers (venire/micrometers if used). These gauges / measuring equipment need certification stickers with applicable certified date and re-certification due date. It is the responsibility of the local service center to adhere to this procedure. Auditors **WILL** be checking this as a top priority. These gauges / measuring equipment could include the following but not limited to:

- Test Rack Power Unit Gauge
- Filling Unit Gauge
- Break Out Unit Gauge
- Line Pull Gauge
- Air Compressor Gauge
- Wet Magnetic Power Unit Gauge
- Black Light
- Black Light Meter
- Field / Gauss / Hass Effect Indicator
- Torque Wrench
- Calipers

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110.080 – Filling Unit Filter Replacement

Filling Unit Filters need to be replaced once a year with the “Date Last Changed” stamped / tagged on the filter or filter housing. The 55 gallon drum units have one screw on type filter and one high pressure 10 micron filter encased in a self indicating housing which shows “**GREEN = GOOD**” and “**RED = REPLACE**”

 NOTE	NOTE
	Replace high pressure 10 micron filter immediately if indicating red.

 NOTE	NOTE
	Service locations with heavy duty filling unit has one spin on filter, one high pressure 40 micron filter which runs in tandem with one high pressure 10 micron filter.

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110.090 – Tool Box List – A289000

Legacy#	JDE#	Description	Qty
A289022	105177	ABRSV,SHT, 120 GRIT	1
A289026	105181	PAPER, SAND, 220 GRIT SHEET	1
A032000	104882	WRENCH, ADJUSTABLE, 12.000 IN	2
A291018	105184	WRENCH, HEX ,HD DRIVE, 0.187	2
901408	104611	BIT, WRENCH SOCKET, 5/16 HEX 1	4
901406	104609	SOCKET, HEX, 1/2 DRIVE 3/8	1
A294005	105191	WRENCH,HEX ALLEN, 0.050 IN	25
A294006	105192	WRENCH,HEX ALLEN, 0.062 IN	25
A294014	105193	WRENCH,HEX ALLEN, 0.1406 IN	50
A294018	105194	WRENCH,HEX ALLEN, 0.187 IN	50
900876	104582	WRENCH, ALLEN, .312 IN	50
901130	104584	ALLEN WRENCH, 0.375 IN L.A 0	25
A294050	105197	WRENCH,HEX ALLEN, 0.500 IN	2
901133	104586	WRENCH, ALLEN, 0.562 IN	25
A292018	105187	WRENCH,BIT,HEX,HD DRIVE 0.187	25
901410	104612	BIT, WRENCH SOCKET, 5/16 HEX S	50
901407	104610	BIT, WRENCH SOCKET, 3/8 HEX SH	25
A579001	105391	DIE, ROUND 4-40 UNC 1.000 IN	3
A579002	105392	DIE, ROUND 8.36 UNF 1.000 IN	3
A579003	105393	DIE, ROUND 0.250 UNS 1.000 IN	3
A579004	105394	DIE, ROUND STOCK, 1.000 IN	1
A289023	105178	FILES	1
A243000	105127	UNIT, FILL, AND DISCHARGE 1 OU	3
A220000	105109	UNIT, FILL, AND DISCHARGE 1 OU	3
A361000	114401	ADAPTER, FILL, ASSEMBLY 5/8 X	3
A708000	114426	ADAPTER, FILL, 5/8 X 3/8	2
A289016	105172	FLASHLITE	1
A296000	105201	TOOL, GREASE GUN,	1
A289010	105166	HAMMER,BALL,PEIN	1
A289009	105165	HAMMER, SOFT FACE, 2.5 IN DIA	1
A239000	105125	TOOL, EXTRACTION, PRESSURE REL	1
A238000	105124	VISCO EXTRACTION.TOOL	1
A289016	105172	FLASHLITE	1
A296000	105201	TOOL, GREASE GUN,	1
A289010	105166	HAMMER,BALL,PEIN	1
A289009	105165	HAMMER, SOFT FACE, 2.5 IN DIA	1
A239000	105125	TOOL, EXTRACTION, PRESSURE REL	1
A238000	105124	VISCO EXTRACTION.TOOL	1
A574000	105388	JACK TOOL, CUTA 1870404B	6
A265000	105131	JACK,TOOL,CUT LEE A2810214B	1

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Legacy#	JDE#	Description	Qty
P022000	107397	COMPOUND, LAPPING, GRADE A GRI	2
P021000	107396	COMPOUND,LAPPING,GRIT:F	1
P023000	107398	LAPPING COMPOUND, 3A, 16 OZ	2
P025000	107399	DYE, LAYOUT, STEEL BLUE, DYKEM	3
P026000	107400	DYKEM,LAYOUT,DRY SOLVENT	2
P040000	107406	TEMPERATURE STICK, 600 DEGREE	3
A580000	105395	WRENCH, TAP, 0.063 TO 0.250 IN	1
A580005	105396	WRENCH, TAP, 0.156 TO 0.500 IN	1
T122000	114742	TESTER, JEVA JET ASSEMBLY	1
T123000	114743	TESTER, VISCO JET ASSEMBLY	1
A290000	105182	TIP, HAMMER SOFT FACE BROWN 2	4
A289002	105158	CHEST,TOOL	1
A289011	105167	WRENCH,SNAP ON #QC2R100	1
A289012	105168	WRENCH, COMPONENT, SNAPON QC3R	1
A289004	105160	PLIER,TRUARC	1
A027001	104879	PLIERS, STANDARD TIP, 16.000 I	1
A289025	105180	PLIERS, TRUARC, STANDARD, SMAL	1
A289024	105179	TIP, TRUARC, 45	1
A289021	105176	CLAMP,VISE,GRIP,CHAIN	1
A289020	105175	WRENCH,VISE,GRID,MOD	3
B228V040	105578	BRUSH, FLEXONE, 4.00 TO 3.50 I	1
B228V050	105579	BRUSH, FLEXONE, 5.00 TO 4.50 I	1
B228V065	105580	BRUSH, FLEXONE, 6.50 TO 6.00 I	1
901403	104607	SOCKET, 0.500 IN DRIVE, 0.250 IN	3
901131	104585	WRENCH, ALLEN, 0.250 IN	10
901404	104608	BIT, HEX SHORT 0.250 IN	10
A451000	105368	HANDLE, HINGE, 1/2IN SQUARE DR	1
A237006	105123	DRIVE,ADAP, 0.375-0.500	1
A029000	104880	HAMMER, RUBBER	1
A804000	105506	TOOL SET, EXTRACTION	1
A239001	789486	TOOL, EXTRACTOR, 0.375	1

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CHAPTER: 120.000 - ASSOCIATED DRAWINGS

120.010 – Drawing Revision Data

120.020 – Assembly Drawings

SIZE	DRAWING NO.
1-13/16" x 1/2"	1529TM01
2-1/4 x 11/16"	1530TM01 (old style), 1530TM03 (mod.)
3-1/8" x 11/16"	1525TM01 (old style), 1525TM03 (mod.)
3-1/8" x 1-1/2"	1623TM01
3-3/4" x 1-15/16"	1528TM01
3-3/4" x 1-15/16" New Style	1528TM03 (new, not mod.), 1528TM04 (mod.)
4-1/4" x 2-1/8"	1523TM01 (old style), 1523TM03 (mod.)
4-3/4" x 2-1/4"	1524TM01 (old style), 1524TM03 (mod.)
6-1/4" x 2-1/4"	1526TM01
6-1/2" x 2-3/4"	1521TM01
7-3/4" x 3"	1527TM01
8" x 3"	1522TM01

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120.030 – Bill of Material

Fishing Slinger Fishing Dimensions

SIZE	DRAWING NO.
1-13/16" x 1/2"	1529TM02
2-1/4" x 11/16"	1530TM02
3-1/8" x 1-1/4"	1525TM02
3-1/8" x 1-1/2"	1623TM02
3-3/4" x 1-15/16"	1528TM02
4-1/4" x 2-1/8"	1523TM02
4-3/4" x 2-1/4"	1524TM03
6-1/4" x 2-1/4"	1526TM02
6-1/2" x 2-3/4"	1521TM02
7-3/4" x 3"	1527TM02
8" x 3"	1522TM02

120.040 – REWORK DRAWINGS FOR 1-13/16" x 1/2" HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION

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120.050 – REWORK DRAWING FOR 2-1/4" x 11/16" HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION

120.060 – REWORK DRAWINGS FOR 3-1/8" x 1-1/4" HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1525R001	Pressure Piston Rework to Widen Split Ring Groove (1525232A)
1525R002	Connector Housing (1505217B) rework to 1525217A
1525R003	Lower Check Valve Half Rework to Rev B 1525234B
1525R004	Lower Check Valve Half Rework 1525234B

REWORK DRAWINGS FOR 3-1/8" x 1-1/2" HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION

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120.070 – REWORK DRAWINGS FOR 3-3/4” x 1-15/16” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1528R001	Connector Housing Rework to 1528217A
1528R002	Lower Check Valve Half to 1528234A to Rev B
1528R003	Lower Check Valve Half 1528234A

120.080 – REWORK DRAWINGS FOR 4-1/4” x 2-1/8” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1523R001	Fluid Housing Rework O-Ring Groove (1523219A)
1523R002	Pressure Piston Rework, O.D. Spirolox Groove (1523232B)
1523R003	Connector Housing (1503217A) Rework to 1523217A
1523R004	Lower Check Valve Half Rework to 1523234A to Rev. B
1523R005	Lower Check Valve Half Rework 1523234A

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120.090 – REWORK DRAWINGS FOR 4-3/4” x 2-1/4” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1524R001	Hard Chrome rework Pressure Housing (1524218A)
1524R002	Connector Housing (1524217A) Rework to 1524217B
1524R003	Lower Check Valve Half Rework 1524234A to Rev. C
1524R004	Lower Check Valve Half Rework 1524234A
1524R005	Upper Check Valve Half Rework 1524235A

120.100 – REWORK DRAWINGS FOR 6-1/4” x 2-1/4” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1526R001	Pressure Piston Rework for Brass Sleeve And Spirolox Ring (1526232A)

120.110 – REWORK DRAWINGS FOR 6-1/2” x 2-3/4” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1526R001	Lower Pressure Piston

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120.120 – REWORK DRAWINGS FOR 7-3/4” x 3” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION

120.130 – REWORK DRAWINGS FOR 8” x 3” HYPULSE FISHING JAR SLINGER

DRAWING NUMBER	DESCRIPTION
1522R000	Pressure Piston Rework 1527232A

120.140 – REWORK DRAWINGS FOR ALL HYDRAULIC TOOLS

DRAWING NUMBER	DESCRIPTION
HR001	Spline Mandrel Set Screw Rework Chart
HR002	3/4-16 Fluid Plug Port Rework for Drill and Tap Damage
HR003	Spline Housing Rework Truarc Groove
HR004	Bronze Ring Rework to Grooved Bronze Ring

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120.150 – REWORK DRAWINGS FOR ALL HYPULSE FISHING SLINGERS

DRAWING NUMBER	DESCRIPTION
HFAR000	Bronze Ring Chart Rework Length
HFAR001	Bottom Connection Rework For Identification Groove
HFAR002	Teflon Ring Rework for 4 3/4 OD and Smaller
HFAR003	Wash Mandrel Rework All Sizes

120.160 – TECHNICAL REFERENCE DRAWINGS FOR ALL HYPULSE FISHING SLINGERS

DRAWING NUMBER	DESCRIPTION
HTR001	Hydraulic Tools Minimum Inspection Dimensions
HTR003	Spline Housing Truarc Groove Inspection
HTR005	Spline Mandrel Minimum Tong Space Length
HTR006	Pin x Pin Minimum Tong Space Length

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CHAPTER: 130.00 – INSPECTION

Pre-Cleaning of Parts and Visual Inspection When a tool is received from a rig or location and signs of rust are evident, the entire tool should be completely wire-brushed to remove as much rust as possible. DO NOT A USE SOFT, OR HARD WHEEL ON ANY MID-BODY CONNECTIONS. Excessive rust or build-up ion the O.D. of the tool can mask cracks or flaws which otherwise should be detected during the inspection procedure.

The I.D. and O.D. of all parts should be thoroughly steam-cleaned for removal of any foreign material that could mask an indication of cracks or flaws.

All parts should be checked visually for washouts, galled threads, tool face damage and any other damage which could possible cause a subsequent tool failure.

The following parts should be calibrated for O.D. wear, using the values provided in Chapter #110.060:

- Upper Connection
- Fluid Housing
- Spline Mandrel
- Pressure Housing
- Spline Housing
- Balance Housing
- Connector Housing
- Bottom Connection

Once parts have been cleaned they must be inspected in accordance with the Wet Fluorescent Magnetic Particle Inspection for Used Jars. After inspection, all parts must be demagnetized and steam cleaned again prior to assembly to prevent the introduction of magnetic particle into the fluid and hydraulic working parts.

The following parts require Magnetic Particle Examination:

- | | | |
|------------------|---------------------|---------------------|
| • Spline Mandrel | • Connector Housing | • Connector Mandrel |
| • Spline Housing | • Fluid Housing | • Bottom Connection |
| • Flow Mandrel | • Pressure Housing | • Top Connection |
| • Wash Mandrel | • Balance Housing | • Hammer |

All internal parts must be cleaned with Varsol or any approve cleaning solution. Blow dry (air) internal parts, and store in a clean area. Always use the lint free towels (P/N C025000) to place parts on.

 NOTE	NOTE
	• Never use the lint free towels to wipe parts.

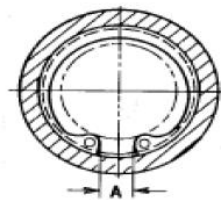
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The Following Parts Require This Method Of Cleaning:

1. Pressure Piston
2. Bronze Rings
3. Pressure Piston Cap
4. Screws
5. Spacers
6. Steel Ring
7. Balance Piston

INSPECTION PROCEDURES AND DIMENSIONS FOR TRUARC GROOVES

FIG. 4:
MINIMUM GAP WIDTH
(Ring installed in groove)



Tool Prefix	Tool OD	Truarc Ring Size	Minimum Gap w/ Ring Installed (A)
1524	4-3/4"	1412V425	0.96"
1526	6-1/4"	1412V525	1.10"
1521	6-1/2"	1412V575	1.11"
1527	7-3/4"	1412V700	1.26"
1522	8"	1412V700	1.26"

 NOTE	NOTE
	After installing the truarc, measure the minimum gap dimension. Ref: (a)
	This will ensure correct seating of the truarc ring in the groove.

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MAXIMUM INSPECTION WIDTH FOR TRUARC GROOVES		
TOOL PREFIX	TOOL OD	MAXIMUM DIMENSION AT TOP OF TRUARC GROOVE
1524	4-3/4"	0.143"
1526	6-1/4"	0.160"
1521	6-1/2"	0.160"
1527	7-3/4"	0.200"
1522	8"	0.200

 NOTE	NOTE
	At every repair, check the truarc ring groove in used spline housings of 4-3/4", 6-1/4", 6-1/2", 7-3/4", 8", tools for angularity at the top of the groove. This angularity causes the top of the truarc groove to be wider than the bottom of the groove. This angularity can cause the truarc ring to become dislodged from the splinehousing. When this happens; the internal parts of the spline housing will be ejected.

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CHAPTER: 140.00 - REVISION RECORD

REV	DATE	DESCRIPTION	PAGE	INITIALS
A	07/18/08	Converted manual to new format	All	C.M.
A	07/18/08	Removed revisions per chapter and added one rev. for entire manual.	140.000	C.M.
A	07/18/08	Added EEP Title Block	All	C.M.
A	07/18/08	Added Safety Chapter	20.000 – 20.070	C.M.
A	07/18/08	Added Tool Box List	110.080	C.M.
A	07/18/08	Added Revision Record	140.000	C.M.
B	12/10/2009	1. Protective Clothing - inserted the hearing protective symbol. 2. Inserted correct 110.040 - Approved Silicone Fluids 3. Inserted Engineering Diagram TMFJ03	1. 20.070 - Protective Clothing - page 9 2. Page 58 of 91 3. 36 of 91	M.W. & C.M.
03	04/27/2011	Updated photo	Page 2	J.B.
		Revision to Engineering Dept. address	30.000, page 11	
		Inserted the revised verbiage for the Gauge / Measuring / NDT Equipment / Calibration	110.070 , page 65	
04	08/30/2011	110.050 – Slinger Specifications (added a tolerance to the housing torque)	110.050, page 63 to 64	C.M./J.B.
05	11/11/2013	Updating all the drawings for the Fishing Jar Slinger Manual TMFJS01 (1- 10) , TMFJS02 (1 – 8) and TMFJS03 (1 – 9) .	TMFJS01 (1- 10) - pg. 12- 22 TMFJS02 (1 – 8) - pg. 24-31	C.M./M.W./K.W.
		Changed the document number from 1-1-GL-GL-PED-00004 to 5-1-GL-GL-PED-00011	TMFJS03 (1 – 9) - pg. 33-41	
		Changed all the old Notes tables, and front manual cover to revised WFT format.	Through out the document and header.	
		Added new approved silicone oil - Wilsil 100 per incident 1082250	Page - 62	
		Added Chapter: 70.000 - Filling (4) drawings.	Page - 42	
07	09/26/2014	Added Wacker AK100 Silicone Oil to the approved Lubricants List	Page - 64	
08	1/8/2019	Updated to OEPS format	All	

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